



Volume 3 Number 11

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June 12, 1984

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- 2 Text Managers

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- COHERENT • PC/IX
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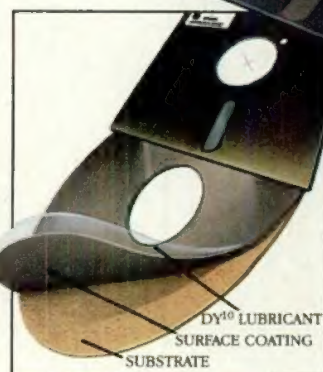
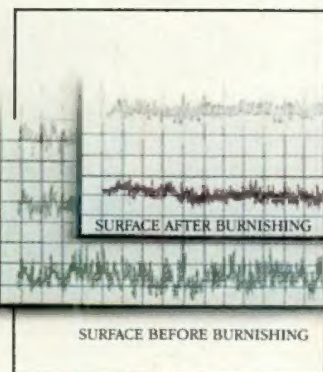
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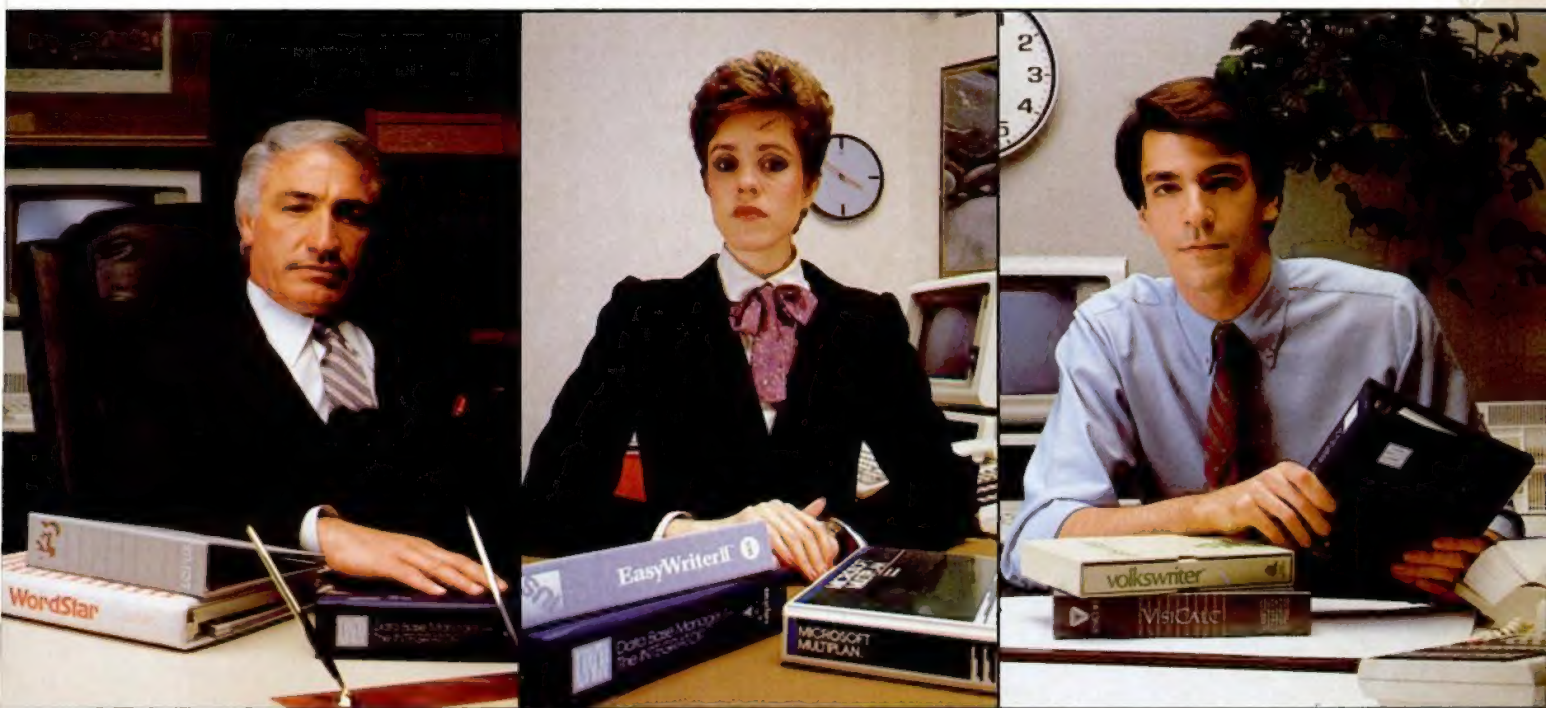
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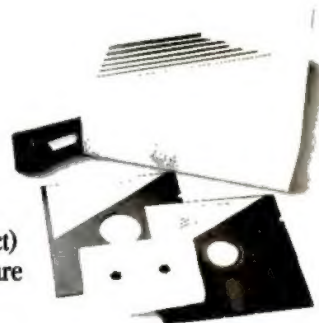
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*DBM II directly reads and writes Lotus 1-2-3 Worksheet (WKS) files. No translating is required.

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Paul Schmitt
Vice President, Wells Fargo Bank

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Paul Schmitt, Vice President, Wells Fargo Bank.

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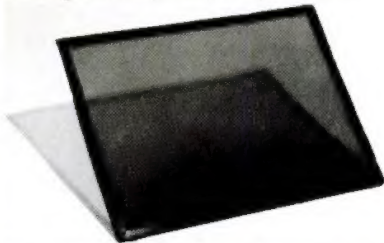
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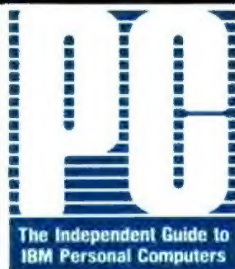
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The Independent Guide to
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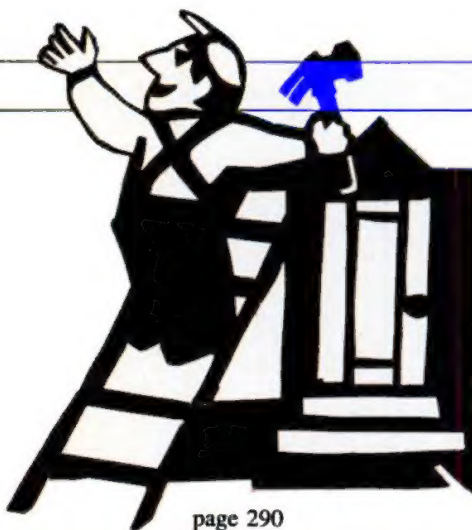
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Dennis Chalkin

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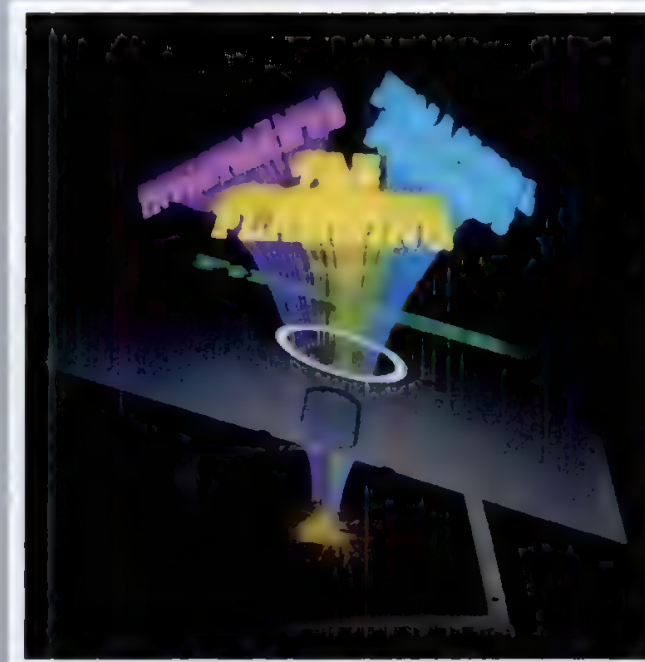
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Burton Alperson, Ph.D.
Reviewer, SOFTALK
June, 1983

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PC Magazine, February 1983

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Money, June, 1983

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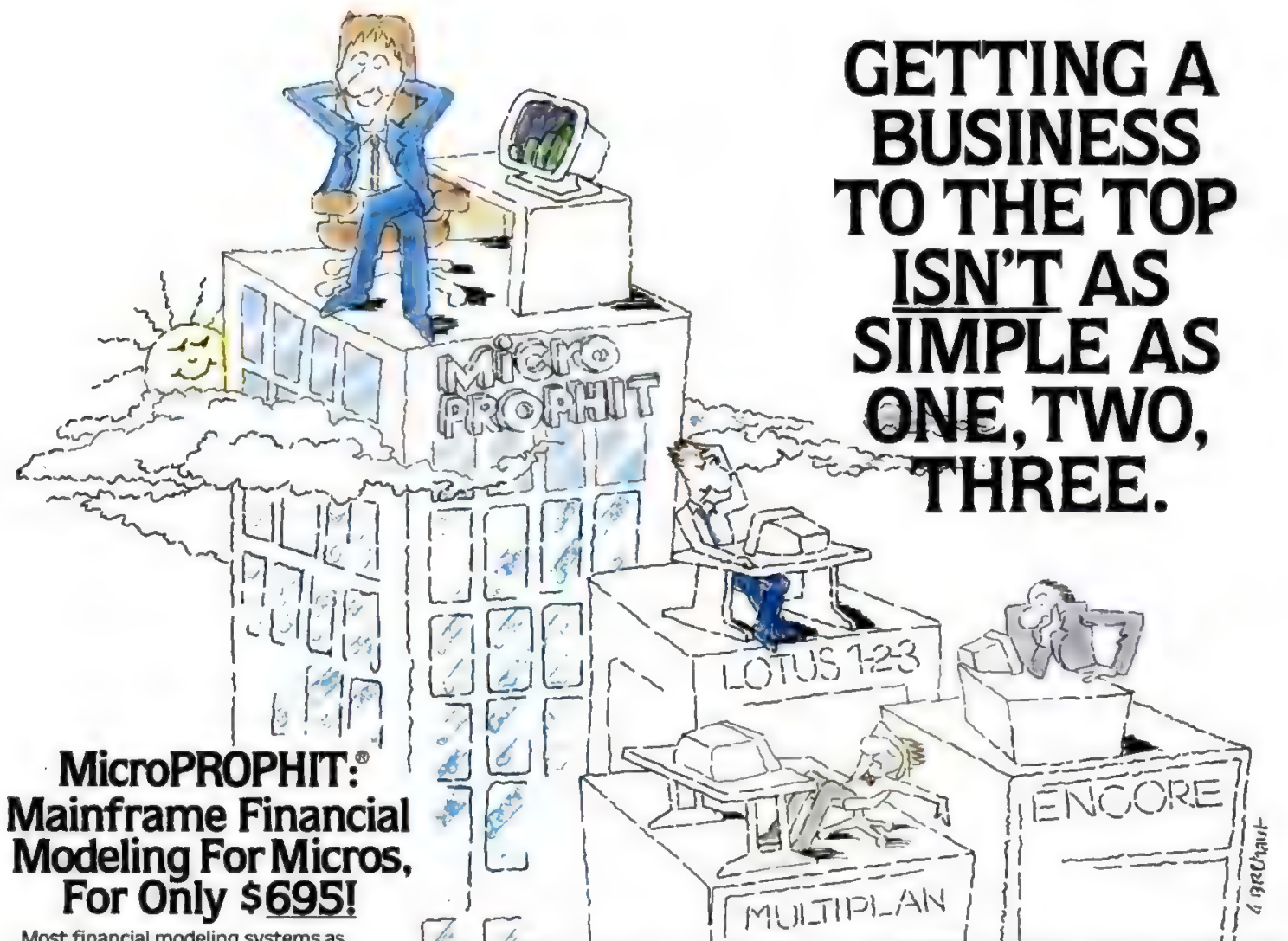
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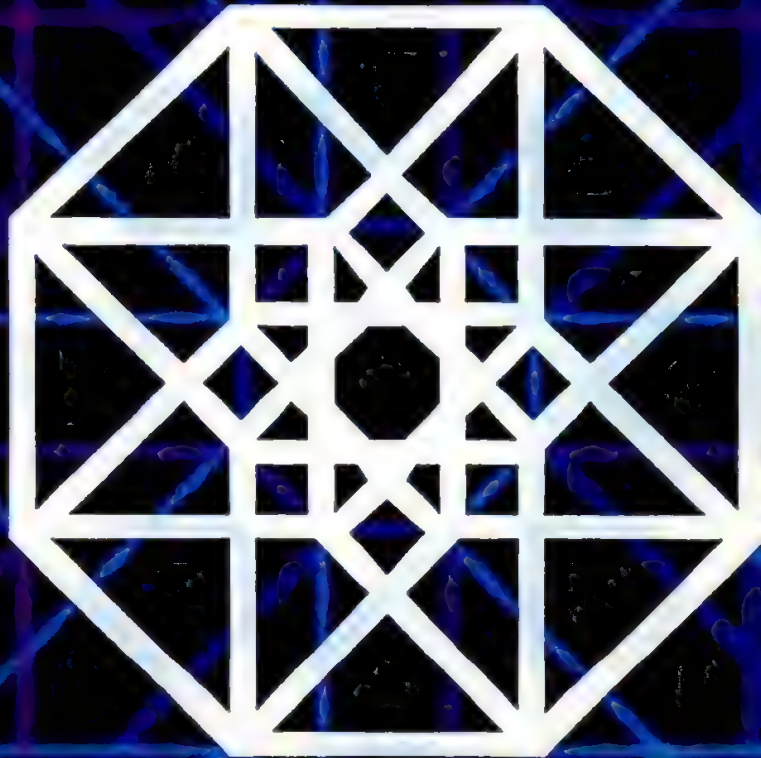


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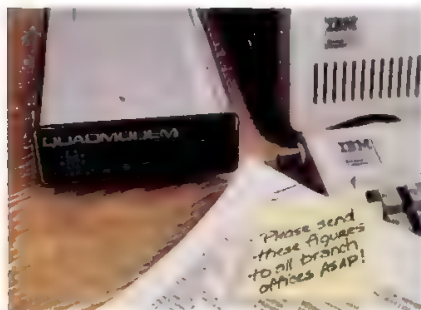
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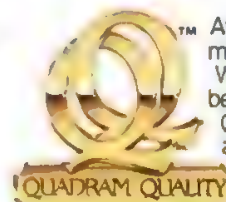
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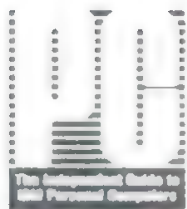
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What's Inside

Organizing PC's six-part review of database managers has been like running a military campaign. First plan, then rally the troops and spend long hours in the chart room.

The six-part database manager review that begins in this issue was more than simply another editorial project. Its purpose was to give *PC*'s readers the most comprehensive rundown of available database products possible. Once plans for the series were set in motion, the staff treated the whole thing more like a military campaign than a simple story.

First, we arranged a large meeting at which we would give the writers their instructions and software packages. For several weeks before the meeting, the *PC* editorial staff collected software, assembled lists of test objectives, and decided which writer would review which packages. It was impossible to walk anywhere in *PC*'s editorial offices without seeing at least two editors hunched over the battle plans.

When the fateful day finally arrived, the plans were ready. The Ziff-Davis conference room had been reserved well in advance, several tons of cold cuts and potato salad had been ordered for lunch, photocopies of instructions were assembled in neat piles, and bags labeled "*PC* Project: Database" were ready to help the writers tote away their assignments. In one end of the room the coffee urn sat like a small Christmas tree, surrounded by piles of colorful and mysterious boxes—the database management software.



By 10 a.m., 16 writers and 3 editors had gathered in the conference room. Associate editor Stephanie Stallings, who had been preparing for this moment for weeks, led the program as editor Bill Machrone and executive editor Mike Edelhart stood by and contributed an occasional comment or opinion.

The Meeting

The writers themselves, 15 men and 1 woman, were interesting types. They ranged from distinguished-looking gentlemen like Frank Derfler and John Dickinson in immaculate three piece suits to the

more scholarly looking, such as Bill O'Brien and Vince Puglia, who wore rumpled sweaters. The tobacco addicts took over one of the three tables and soon filled the conference room with a soft cloud of smoke.

At 12:30 p.m., the scribes broke for lunch and soon reduced the pile of food to a mere memory. Many of the participants only glanced at the table, preferring to spend their free time investigating our infamous Toy Shop (where all our computers live).

At about 3:30 Edelhart donned his official Operation: Database T-shirt (over his shirt and tie), drew himself up like General Patton addressing the troops, and gave a truly inspiring speech whose contents could best be boiled down to "Do your darndest for the home team." Machrone, who had been supervising the proceedings from the front of the room, exhibited the official Operation: Database totebag, and Stallings began playing Santa Claus, handing out bundles of software right and left. (Incidentally, one of the major complaints the staff later received from the writers was that the totes turned out to be too small when it came time to return the software, the disks, and the manuscripts they had accumulated during the review process.)

The object of the most intense curiosity turned out to be the *CIP* database manage-

WHAT'S INSIDE

ment package, which resembled an expensive box of chocolates. It easily won the contest for the database manager most likely to be sold at Bloomingdales. (Writer John Dickinson later reported that the fancy packaging was for the sake of promotion only—the one consumers receive will be somewhat less elaborate.)

On the other end of the packaging scale was *PC-File III*, a piece of freeware by Jim Button that came in a manilla envelope with explanatory printouts. Of course, the writers found, beauty of the packaging has nothing to do with the efficiency of the product.

The Aftermath

Once the last writer had left, Machrone, Edelhart, and Stallings breathed a collective sigh of relief. They hoped for at least a short respite from the project. But they hoped in vain. Almost immediately the calls started coming in.

At first, the problems were simply with categories. For example, a couple of days after the meeting, Richard Zander called Stallings to tell her that he had been assigned level 3 software, but he believed he was better qualified to review level 2. Stallings was impressed that Zander had called her so early (rather than after most of the other reviews were in), but now found herself in something of a quandary. Whose packages would she give Zander and who would review his?

Fortunately, fate intervened in the form of Don Layman, who, having missed the major meeting, was at that very moment sitting at Stallings' desk receiving his instructions. Layman, who runs his own computer consulting firm, immediately agreed to switch assignments with Zander, and everyone (Stallings not the least) was happy.

A somewhat more bothersome problem occurred when Frank Derfler (who buys computers for the Air Force) called. For the tests, two sample files had been created using the SDF and SEQ data formats. However, one of Derfler's packages refused to import the data in either of these

files—it wanted DIF-format files and it absolutely refused to play with anything else.

To accommodate that recalcitrant program, technical assistant Mike O'Conne had to take a crash course in the DIF format. He ended up writing programs in BASIC to convert the SEQ files to DIF.

The reports started coming in. Many of the writers, not content with the simple, one-word commentaries that their report sheets requested, contributed more lengthy or colorful opinions. Ed Joyce asked, "Are you bestowing awards to

mammoth task: setting up a chart to help readers efficiently compare the software. Editorial assistant Roz Tobias, whose experience with her two children had given her enormous expertise in cutting and pasting, began laying out the various categories and fitting in the authors' answers and comments.

The chart grew like a thing possessed. By the end of the first day, it looked like a PC version of the Dead Sea Scrolls. The members of the art department, not to mention editor Bill Machrone, were racking their brains to find a way to fit it into



From left to right: Associate editor Stephanie Stallings, editor Bill Machrone (foreground), executive editor Mike Edelhart during the writer's conference.

those vendors who supplied the most creative answers in response to the database questionnaire? If so, I have a prime contender. When asked about export data capability, Hoyle and Hoyle (*Query!2*) listed its overseas distributors. Would this list be considered a DIF, special, or programmable format?"

The Chart

Once a fair number of questionnaires had been returned, we began the final

the pages of a normally proportioned magazine.

By the second day, the chart took up two tables the length of the conference room, and two, sometimes three, editorial assistants were busily filling in the information that was coming in from the authors. When finally finished, the scroll was 12 feet long and displayed 100 columns of data—a truly impressive sight, appropriate for what we believe is a truly impressive issue of *PC Magazine*. ■

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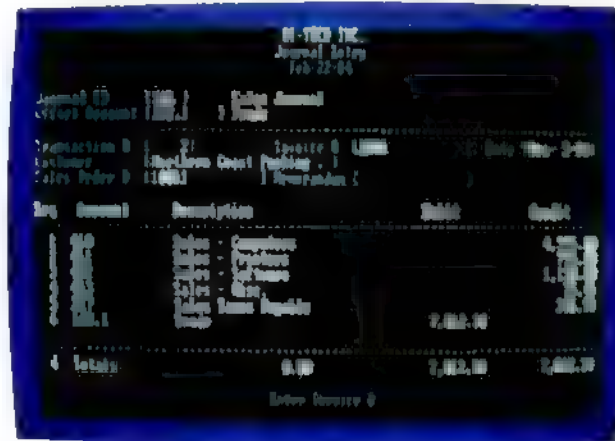
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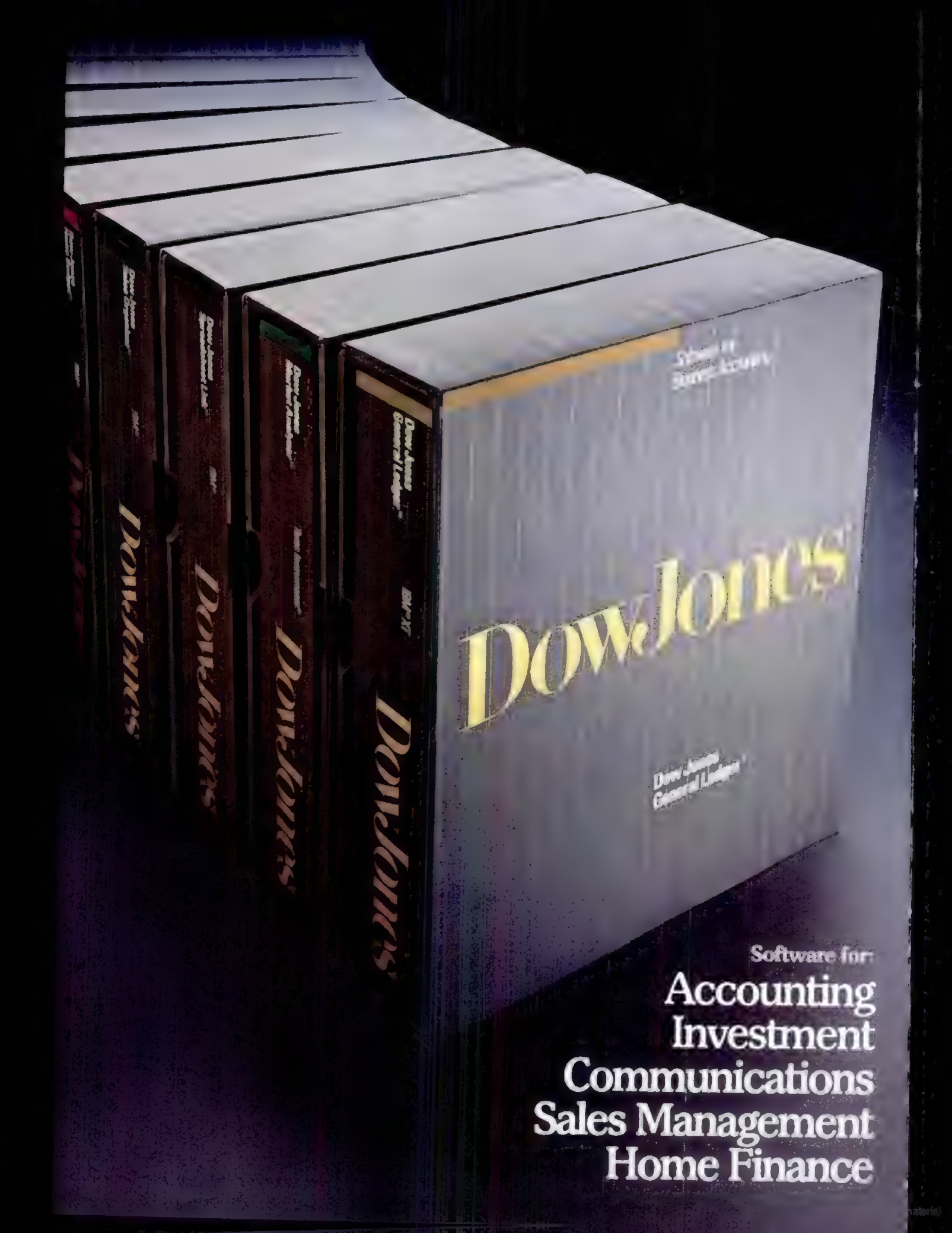
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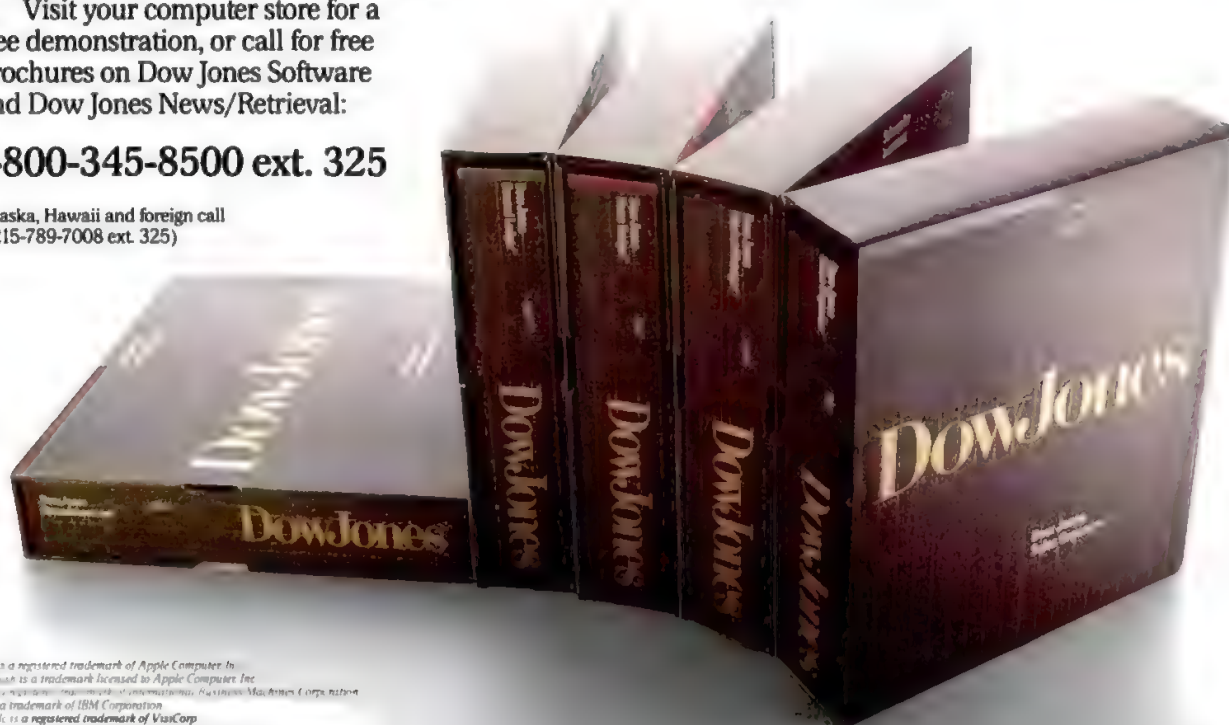
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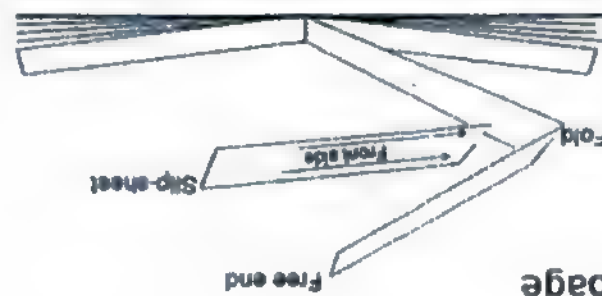
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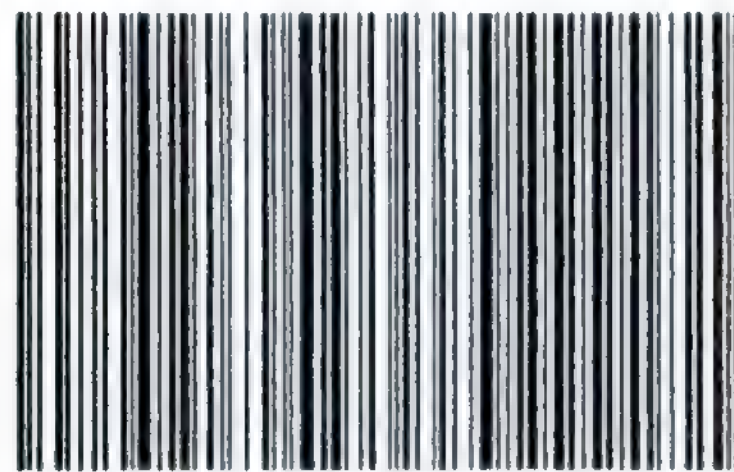
2. Arrow pointing to the fold

3. Slice the folded edge

4. Close the page and slip-sheet



Inverted Foldout slip-sheet



GbsSlipSheet-001



Foldout slip-sheet

Folded edge of the page

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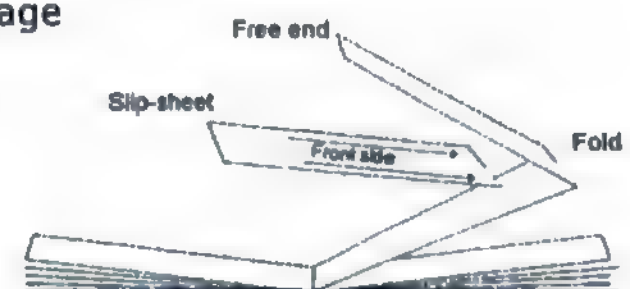
2. Insert this sheet with

1. Front side touching the free page

2. Arrow pointing to the fold

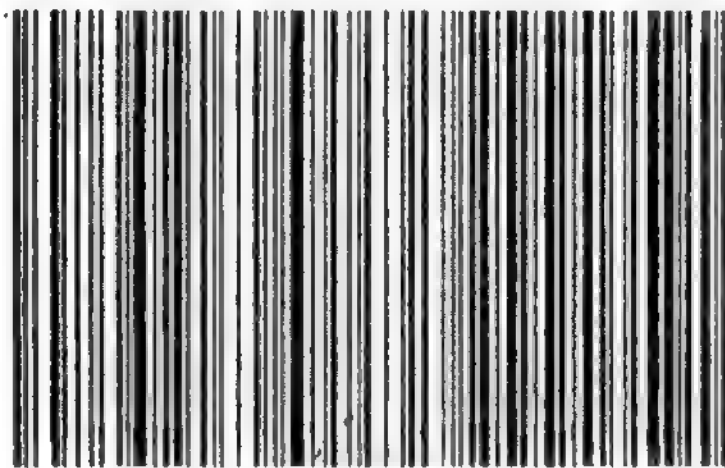
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4. Close the page and slip-sheet



1. Follow instructions on the other side

Inverted Back



GbsSlipBack-001B

Back

1. Follow instructions on the other side

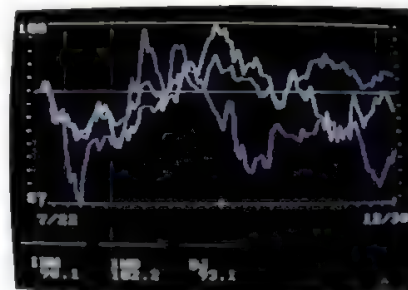
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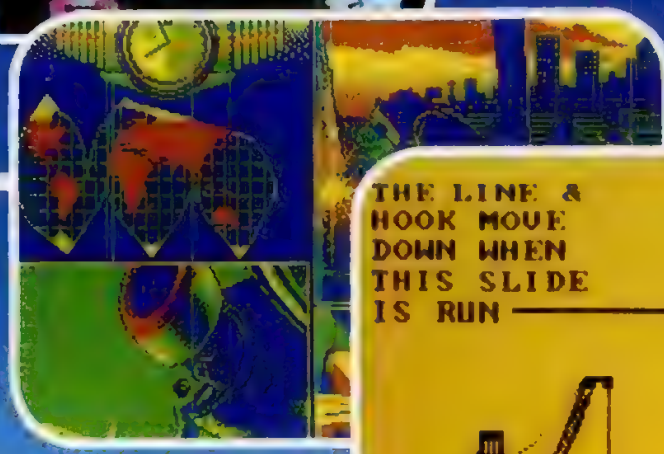
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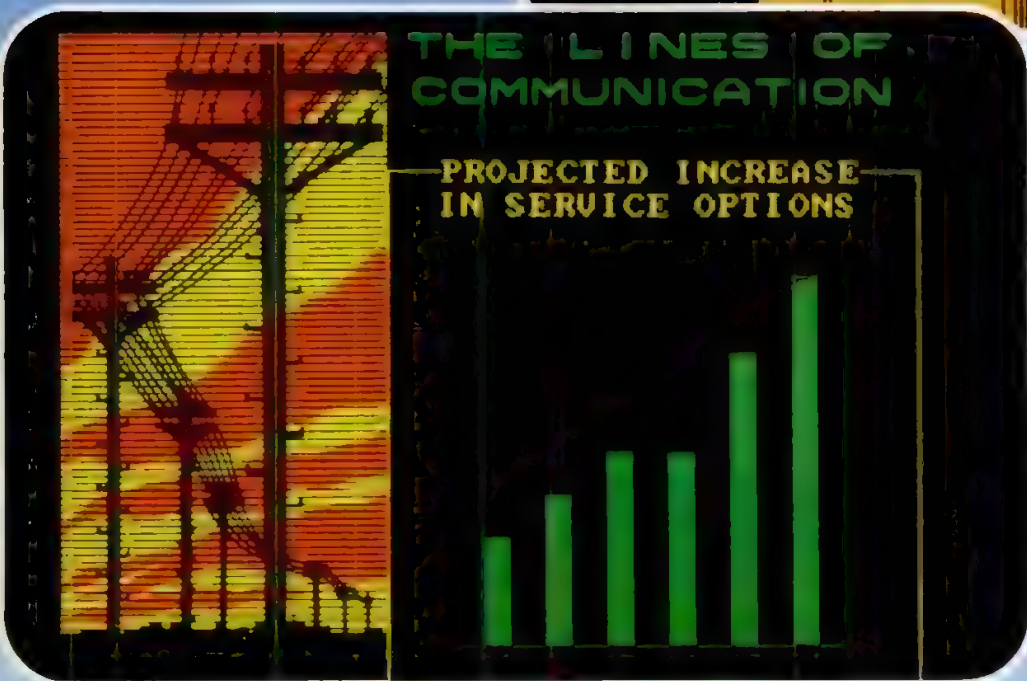
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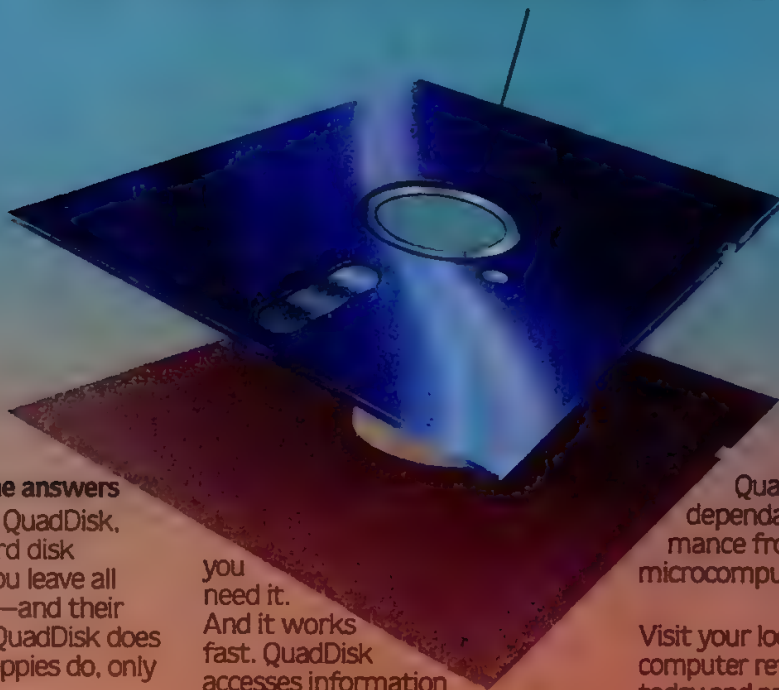
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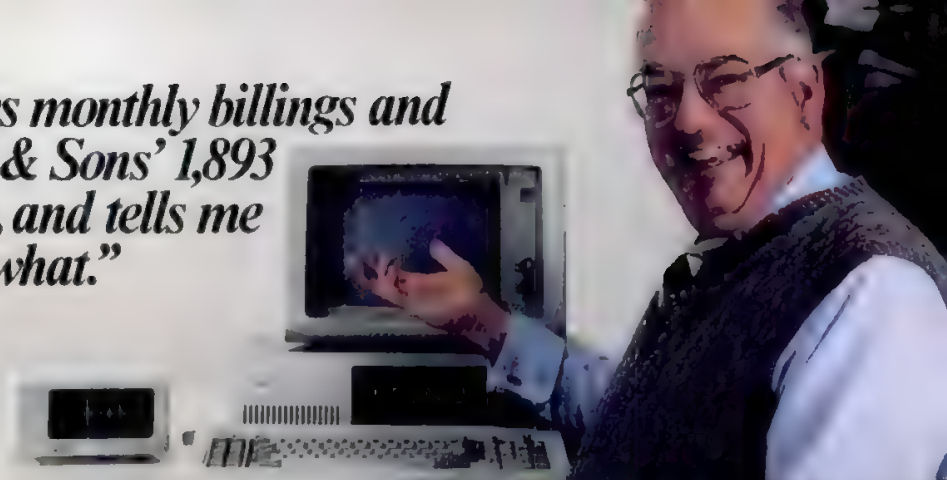
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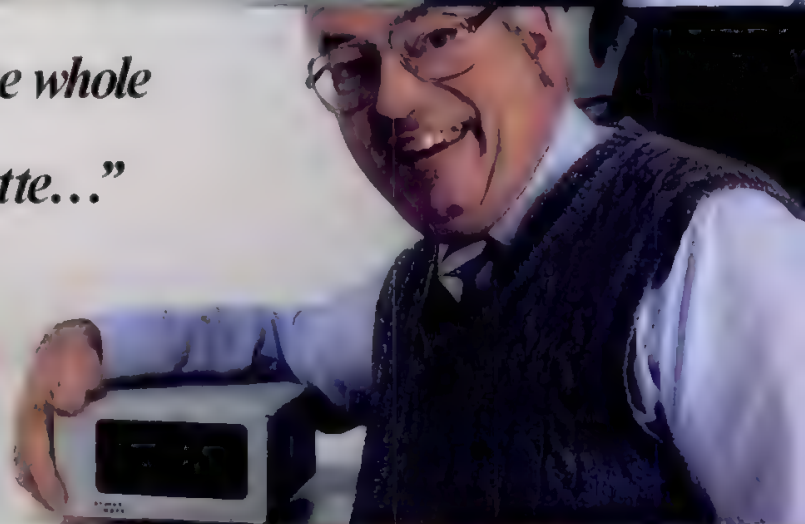
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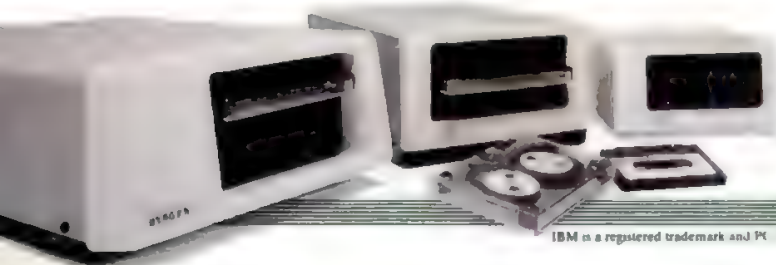
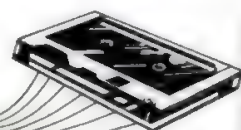
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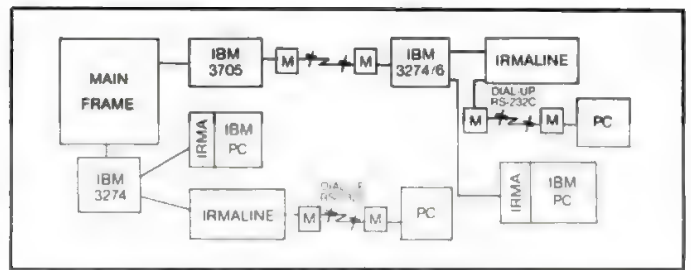
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PC News

FROM THE EDITORS OF PC

JUNE 12, 1984

Ashton-Tate Revs Up dBASE III

Good news for users as dBASE sheds limitations, gains new power in dBASE III

BY BILL MACHRONE

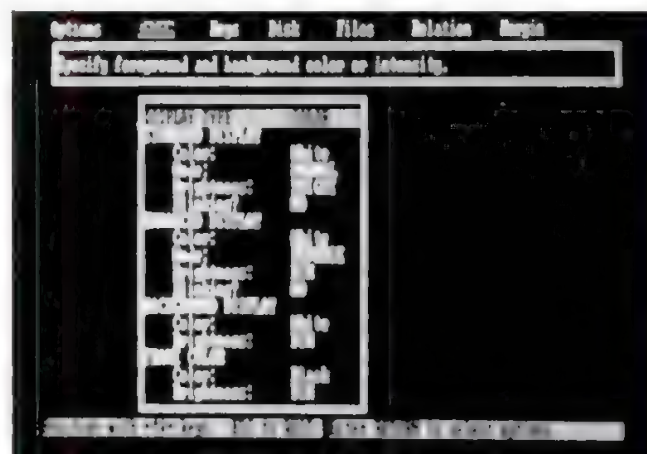
CULVER CITY, Calif.—Do you mess with success? If you're Ashton-Tate and the product is *dBASE II*, the answer is a vehement "yes." The new version is called *dBASE III*, and it builds on the initial product's strong user base as the foundation for a thoroughly modern database management system with an integral programming language. Its Spring COMDEX introduction will be followed almost immediately by distribution by retailers in June.

Ashton-Tate led the way with *dBASE II*, the first widely-accepted database management system available for personal computers. They made it easier for the uninitiated in the form of *Friday!* They branched out into the integrated software arena with the recently announced *Framework*, and now seek to retain their leadership position by introducing *dBASE III*.

While *dBASE II* has built a loyal following and a strong third-party software market (see *PC Volume 3 Number 2*), it has been criticized, not unfairly, for some of its shortcomings. The *dBASE III* package does away with the complaints about the earlier product and goes considerably beyond with new features

and capabilities.

With *dBASE III*, Ashton-Tate has completely rewritten the enormously successful database manager, this time in C instead of assembly language. In so doing, it has freed the product from its 8-bit heritage and the concomitant limitations. In fact, *dBASE II* will remain on the market, but for 8-bit machines only.



The more significant improvements in *dBASE III* include:

- Number of fields per record is now 128, up from 32;

- Maximum record size is 4,000 bytes, up from 1,024;

- Number of files open si-

(continued)

H-P's 9-pound Portable Packs Lotus 1-2-3, MS-DOS

No internal disk drive, but 272K RAM and \$795 drive for 3½-inch disks available for \$3,000 lap machine

BY ROBIN WEBSTER

CUPERTINO, California—To many people, a portable computer is simply a personal computer with a handle attached. To Hewlett-Packard Co., however, a portable computer is now an 8086-based machine that runs off three rechargeable batteries, weighs less than 9 pounds, and comes with MS-DOS version

2.11, a full version of Lotus' 1-2-3, plus a bundle of other software locked into internal ROM memory.

The \$2,995 portable also features an 80-column by 16-line liquid crystal display that can handle graphics (such as those produced within 1-2-3) at a resolution of 480 pixels across by

128 pixels down. It will be available after May 15.

Since the Hewlett-Packard 110 uses the 16-bit 8086 chip as a central processor and MS-DOS version 2.11 as its operating system, it seems likely that the machine will run almost all of the popular programs available on (continued on page 40)

dBASE III (continued)

multaneously is 10, up from two;

- New data types: date and text (variable length strings up to 4,000 bytes long);
- On-line help and context-sensitive prompting;
- Much faster indexing and sorting;
- Increased numerical precision.

The new features are significant, too:

- An interactive tutorial and command building subsystem, tentatively called dBASE Assistant;
- Full-screen operation of features such as SET and REPORT;
- Additional functions and calculations, such as access to system clock, case shifting options, and days between date calculations;
- A built-in mailing label generator;

- The ability to do single-record JOINS on the fly, making it easy to do "master-detail" associations.

New users will also find dBASE III far more attractive. The combination of new full-screen functions, on-line help, and query by example put it squarely in league with other contenders in the hot database market. Furthermore, the BROWSE and LIST functions are enhanced, giving faster response, field names at the top of columns, and other attractive improvements.

Old Ties

Despite all the enhancements, there are strong ties to the past. An included program reads dBASE II files and converts them into dBASE III format. Command language syntax is sufficiently similar for most programs to run unmodified. Wayne Ratliff, creator of dBASE II and chief architect of the new product, says, "Around 90 percent of the

command files that we've tested work with dBASE III. Those that don't generally require only minor modification, but unusual programming styles can drive this figure lower."

dBASE III's features and refinements didn't come easy. He and a team of programmers have worked on little else for the past 22 months, Ratliff emphasized.

Secret Project

"We've had a tough time keeping the lid on this one," commented Jack Brantley, Ashton-Tate's director of communications. "A majority of Ashton-Tate employees had no idea this was in the works, especially so hard on the heels of our Framework announcement."

Part of the concern over secrecy was to ward off the so-called "Osborne Effect," killing demand for the current product due to too-early announcement of a successor. But that didn't hurt the planning process for marketing. The product is priced at \$695, competitive in light of its new features. Current

owners of dBASE II can trade up to the new version for \$200. Bolder still, Ashton-Tate will sell you a copy of dBASE III for \$200 if you trade in an R:base 4000 system disk (a competing product).

Framework, due out in July, will be marketed in a similar manner, available for trade to Lotus' 1-2-3 users for \$200. Such aggressive marketing is new to the personal computer industry. (It will be interesting to see what Lotus Development and Microrim, manufacturer of R:base, offer as a riposte.)

The principals at Ashton-Tate are justifiably proud of dBASE III, especially its ease of use.

"The programmers finally met a human being," jokes Hal Pawluk, Ashton-Tate's advertising leader. Pawluk has been an avid dBASE II user from the first, and has tested dBASE III's new features every step of the way. His criticisms and suggestions are well taken by Ratliff and the others. "He's a pretty good guy, for a nonprogrammer," says Ratliff.

Pawluk has good reason to stay close to the programming team—he's writing the documentation for the new product. Ratliff, meanwhile, is finally joining Ashton-Tate as a corporate officer. Up to this time, he has been an independent, albeit closely coupled, corporation. You may have noticed that dBASE II Version 2.4 is copyrighted by RSPI; it stands for Ratliff Software Protection, Inc. The new version has been developed largely within Ashton-Tate. Ashton-Tate has a new development shop in Glendale, California, staffed with some of the personal computing world's best "old hands" and some of the brightest newcomers.

PCs for Development

Unlike most other firms doing their software development in C, Ashton-Tate's crew still uses PCs, networked into a minicomputer. Others program in C on minicomputers, then cross-compile the code onto the PC. "You can't get a feel for the target machine through a cross-compiler," says Ratliff. "That's why all of our programmers use PCs."

Hayes Switches to Please With Easy Database

BY KAREN COOK

ATLANTA—Hayes Microcomputer Products, the modem company, has announced *Please*, a "mid-range, highly functional, easy-to-use" database management system that is positioned against Ashton-Tate's *Friday!* package. *Please* will retail for \$349, considerably less than dBASE II costs, but more than pfs:File from Software Publishing, for example.

Mel Philips, Hayes' product manager and the author of *Please*, says his program is "not a technical wizardry product, but it is probably one of the most functional and complete products out there."

The database handles 99 characters per field and 2,000 characters, or 99 fields per record. It may take as little as half an hour for a first-time user to create a database, Philips said.

The product has an extensive help facility—a core of 700 help messages that can appear in about 20,000 combinations. At the touch of a key, the program displays a small help screen that details exactly what keys the users should press next.

For people who would rather not devise their own databases, Hayes will sell a series of \$29.95 templates set up to keep records of sales contacts, music collections, memberships, or bills paid.

Users can enter data in several ways: on preformatted screens, by customizing their own screens, or by transferring data from other major software programs such as *WordStar*, *dBASE II*, *1-2-3*, *VisiCalc*, and *Friday!*.

Data takes 5 or 6 seconds to enter, rather than the customary 3 or 4 seconds for database pro-

grams, because *Please* goes through a data protection routine, Philips says. Even if someone unplugged the computer, he claims, only the last record entered might be lost.

Please offers a variety of formats for pulling out information from the database: List, Form, Replacement, and Export. List presents information in standard columns, Form allows users to print lists on mailing labels, for example, and Replacement permits mass deletions of records or substitution of one field for another. Export arranges information for delivery to BASIC, Pascal, or applications programs.

One option is the Quick List feature, which allows users to ask for specific information from larger records. For example, you could take a file of all the dentists in the southern United States and extract just the phone numbers of all the dentists named Tooth who lived in Molar, Alabama.

Please, which requires two drives and 128K RAM, is scheduled for sale in June. ■

Computer Caches Capture Cachet

Portable designers bag the attention of users on the go. Halston, where are you?

BY JAMES LANGDELL

NEW YORK—Whoever imagined a stylish accessory could shape a computer's success, until Apple ran full-page newspaper ads that featured the Macintosh's backpack-like bag?

Apple's new fashion inspired us to take the IBM and IBM-compatible bags out of the closet for a closer look. We gathered a sampling of carriers for the IBM, Colby, Compaq, Corona, and Hyperion computers, loaded them up, and took them through some paces.

A Sack of Apple's

The Macintosh bag is distinctive enough to lead to a good and a bad reaction. People who desire this trendy accessory might buy the bag but say "Hold the Macintosh!"

Also, a large colorful Apple logo on the bag screams out to the underworld. "Inside is something worth at least \$2,500. Grab me and run!"

IBM Makes Its Case

The IBM Portable PC bag is made of a waterproof synthetic material with the look of fresh blue denim—here Big Blue confronts Apple's hippie image head on. The bag itself is shapeless, but it fits trimly around the computer (IBM's ads for its bag could well say, "Nothing comes between me and my Portable PC.") The fittings are all of substantial metal, and the double handles on the wide zipper have amusingly large metal rings to pull.

The IBM label on the bag is very understated: a 1-by-½ inch tab that thieves might easily overlook. If an athletic executive dashed with it through an airport, it would probably be mistaken for a two-suit folding garment bag.

The PCjr carrying case is the smallest of the lot, but it has, of course, a smaller computer to carry. It looks like an adult's (but not an executive's) large

hard-vinyl briefcase.

Compaq's Texas Leather

Compaq's bag (\$185) promised to be the classiest—a leather bag. (Compaq also sells a nylon bag for \$75.)

The leather is bonded to a plastic inner lining, with pouches for replaceable sheets of stiff cushioning foam. This bag's fittings are unimpressive; the zipper handles have leather pull tabs looped through their holes, but the leather looks like it could come unglued easily. There are large zippered storage pockets on either side of the case, wide enough to carry large printouts.

The Compaq name appears with a dashing color stripe at the bottom right of both sides of the case. This slick logo, however, makes the case look more like vinyl than the leather it really is.

Corona's Plastic Pride

The Corona bag (\$70) doesn't try to hide its nylon surface—it bears it with pride. Even more than the IBM bag, this looks like a respectable garment bag, so it doesn't tip

thieves off to the electronic value within. The Corona logo is attractive and clearly visible, but this brand name doesn't yet have enough street recognition to invite danger.

The straps are reinforced with black patches at the stress points where they join the case. It's easy to slip a few disks into the pocket underneath the Corona logo, but there's no protective flap. The strap's rubber shoulder pad, though lightweight, has an excellent grip.

Colby's Broad Shoulders

Colby Computer, of Mountain View, California, makes the sturdiest bag (\$139), with the heaviest outer fabric, thickest inner padding, and generous leather reinforcement around the edges. Even the handle wraparound is leather and has brass snaps instead of velcro. The lid is held down by broad strips of velcro and is split in the middle so the Colby computer's handle can stick out.

Colby's shoulder strap has a pair of bands and a very wide leather shoulder pad that distribute weight well.

Strolling Hyperion's Lanes

The Hyperion computer is smaller than the other transportable machines, and its bag was small as well. Unfortunately, this vinyl bag doesn't have a sporty style—it looks like it should be carrying a bowling ball. But if you wish to stroll safely past silicon snatchers, this is an excellent disguise.

Pick of the Bags

Ignoring the merits of the transportable hardware inside, which bag did we choose as our favorite? Individual opinions varied, due to physical as well as aesthetic differences. For example, the Colby bag was the best fit for a 5'11" frame, but its huge shoulder pad was larger than the shoulders of a small member of our staff. (Her shoulders handled Corona's bag with the greatest ease.)

Most of these manufacturers obviously take pride in the bags that bear their names. If IBM ever proves more than a match for these compatible computer makers, they might try tackling American Tourister or Louis Vuitton next. ■



In left-to-right fashion, these bags are for Colby, Compaq, IBM PCjr, Hyperion, Corona, and IBM Portable PC computers.



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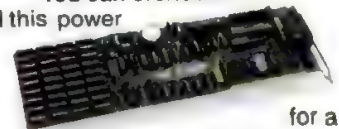
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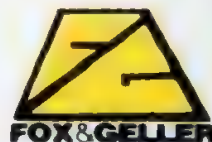
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H-P's Portable (continued)

the IBM PC, even though there's no internal disk drive.

There are two ways in which the user can do this. The first way is to obtain programs from companies such as Microsoft (*Multiplan*, *Chart*, *MS-Basic*), Chang Labs (*Microplan*), Ashton-Tate (*dBASE II*, *Friday!*) Micropro (*WordStar*, *Mail-Merge*), all of which (and more) are expected to be available on 3½-inch disks. An external, double-sided, 3½-inch disk drive powered by batteries and capable of storing up to 710K will be sold by H-P so that these programs can be used. The probable cost of this device is \$795.

The second method is to buy a circuit board/software combination called HP Link. This circuit board plugs into an IBM PC or lookalike with a special HP Interface Link cable connecting up the HP 110. Once this hardware has been installed and the special software loaded, the HP 110 can then make use of the larger system's facilities—including a printer, the disks, and other peripherals—as if they were part of the portable.

The HP 110 compensates for the lack of an integral disk drive with 382K of ROM, which permanently stores the operating system and selected applications software, and 272K of RAM, which is totally available to the user when using the ROM-based applications. Up to 176K of the 272K RAM can be reserved for use as a RAMdisk. The benefits of such a configuration were obvious during a demonstration at H-P's Cupertino offices when a *WordStar* file was transferred from a Compaq system to a HP 110 and then listed on the liquid crystal display (LCD) in a matter of seconds. The response time when, say, converting *1-2-3* spreadsheet data into a graph was very quick as well.

Symphony Space

While many people will be impressed by Hewlett-Packard's idea of placing *1-2-3* into the machine's ROM, complete with all the help text, they probably would be even more surprised to learn that the HP 110 development team had originally designed the hardware around Lotus Development Corpora-

tion's recently announced *Symphony*. Delays with the release of *Symphony* meant *1-2-3* will be provided initially, followed by what is described as "a very easy and low-cost" method of upgrading to *Symphony* as soon as it is available.

In addition to the Lotus product and MS-DOS version 2.11, the HP 110 ROM contains: a simple (ASCII) word processor called *Memomaker*; a user-friendly front-end to MS-DOS called PAM (Personal Applications Manager), as used on the HP 150 microcomputer; and an

asynchronous terminal emulation package that supports file transfers. A built-in 300 baud auto-answer, auto-dial modem also simplifies communications.

Hardcopy of documents and graphics created on the 110 can be obtained either by using a larger machine's printer or by attaching Hewlett-Packard's ThinkJet printer. This battery powered unit uses replaceable ink jet cartridges and produces a variety of type styles and sizes at speeds up to 160 characters per second. ■



H-P's New LaserJet Printer Looks, Functions Like Copier

For \$3,500 LaserJet offers technical breakthrough; connects to IBM, compatibles via RS-232

BY ROBIN WEBSTER

CUPERTINO, Calif.—The notion of using a Xerox photocopier as a printer for your personal computer may sound like a good idea but not a practical one. Hewlett-Packard Co., however, is offering the next best thing: a \$3,500 laser printer that can attach to a range of personal computers.

This LaserJet will attach to the standard RS-232 serial port on HP and IBM-type machines, and, according to the company, should work with most of the popular software packages. HP says that printer drivers for the major packages are in the

works.

LaserJet is capable of producing multiple text fonts and text sizes by means of plug-in ROM cartridges, each of which will allow the user to select from three different type fonts.

A very useful feature is the ability to print out very wide worksheets in "landscape" mode. Instead of printing across the 8-inch edge of a standard piece of paper, the LaserJet rotates every character 90 degrees and writes down the 11-inch page depth instead. In compressed font mode, using landscape printing, the LaserJet can

handle documents up to 176 characters wide.

Photocopy Technology

Whereas dot matrix printers create characters mechanically as a pattern of dots on a piece of paper, laser printers use much the same technology as photocopiers to format and print whole pages of information at a time. One immediate difference a LaserJet user will experience, therefore, is a delay between the time the "print" button is pressed and when the printer physically moves into action. During this period, the LaserJet

is loading a whole page of text and/or graphics into its 50K internal buffer and then uses its solid-state laser to scan the document's image across the surface of a special copying drum.

From this point on, the whole process is virtually the same as that inside a Xerox machine: The "electrostatic" document image created by laser on the copying drum is transferred to a sheet of ordinary paper; plastic-based toner is allowed to adhere to the electrically charged areas, and the toner is then fixed in place by a heat source. The quality of the output is similar to that obtained on a good photocopier since the LaserJet printer can produce up to 300 dots per inch (dot matrix printers usually print only between 70 to 150 dots per inch).

The LaserJet features an automatic paper feeder that can hold up to 100 sheets of standard copier paper and can cope with up to 8 pages a minute. It is expected to be available after June 1. ■

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BY TOM CHRISTOPHER

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depending on configuration.

The Museum of Modern Art in New York has finally chosen a personal computer for its permanent design collection. It's a Mindset, a new entry in this market with excellent graphics. For an industrial designer, having a work chosen for MOMA's collection is the equivalent of winning an Oscar, an Emmy, and the Nobel Prize in one shot. It will sit next to an Eames chair, Braun coffee maker, brass ship's propeller, and other classic designs.

A quick look at this computer underscores that it is an incredibly beautiful piece of work, a perfect example of form following function, like a Porsche or a Jaguar. It makes the IBM product look like a Ford LTD, the Apple Mac like an AMC Gremlin. It's low and sculptural, with an expansion unit that snaps on to the top of the system unit with no cables and contains memory of up to 224K, disk drive storage, the DOS, and inserts for expansion modules (not just boards) in the back.

The system unit holds a 16-bit Intel 80186, plus the system's memory—32K of ROM and 64K RAM. The dual disk drive ports are well designed with semicircle cutouts for easy access, and built-in interfaces for the monitor.

At Mindset I spent about 45 minutes with Roger Badertscher, the former Atari president who is the force behind the company's personal computer. He truly believes in the image pro-

cessing revolution and wants to bring a graphics tool—one that can be an end in itself—to a low-price market. It also must be compatible with the IBM PC so that you can run everything from Lotus' 1-2-3 and WordStar to Zork III on it.

Fast, Fast

On performance, the most impressive thing about the Mindset is its speed. Images move on the screen at 800 nano-seconds/pixel. The menu, which appears at the bottom of the monitor, can be called and removed instantly with the

mouse for function changes.

It's by far the fastest micro I've ever seen. Apparently this is due to a 6MHz clock and two 16-bit processors running side-by-side—the graphics on one while the Intel 80186 is on a separate system bus. The setup is available with 256K RAM and two disk drives plus the power of two VLSI graphics coprocessors, giving the Mindset a lot of the strength of larger, more exotic art computers.

A very important point is that the resolution is 320 by 200 pixels, so any claims about replacing or making \$50,000 systems

obsolete is nonsense. The resolution dictates the price.

Spray Painting

Using the Time Arts package, *Lumena*, the Mindset can perform most of the functions of the large computers, though: thick/thin brush strokes, fill to cover large areas, zoom, rubberbanding to create geometric shapes, and straight horizontal/vertical lines. It does several things I've never before seen performed on a micro. By a process of dithering you can airbrush up to four colors at one time. This function works like a can of spray paint: the longer you hold it in one area, the denser the coverage. With the combination possibilities in airbrush, many colors can be visually mixed by placing two colors next to each other to create a third, as in pointillism or the four-color printing process.

Another nice feature is the ability to remove a specific color from the screen, whether it's been airbrushed, drawn, or painted over a large area. The circle and ellipse functions seem to work well. A center point is marked and "tics" or cursor marks rubberband to indicate the perimeter before you set the line in place. Once again, the motion for all of the functions is incredibly quick.

I only spent a few minutes alone with the Mindset system and obviously can't wait to fully test its computer graphics potential. As with any graphics system, the acid test will be to see how the images look on the printed page. ■



Grocers Now Also Shop for PCs

AUBURN, Maine—New software for your grocer's PC just might trim meat prices, slice deli costs, chop the cost of making a salad, and help you catch up with your fish bill.

Supermarket Data Systems, Inc., a subsidiary of Foodtown Supermarkets, Inc. of Auburn, Maine, has announced a *Perishables Management System (PMS)* program that helps grocers fine-tune consumer prices

(and grocers' profits) in the perishables department: meat, deli, produce, and fish.

Completely menu-driven, PMS allows the grocer to analyze his profit on every product, the quantity sold, and total dollars generated from sales of each product, according to company president Michael Abromson. Weekly inventory figures and bar code readers provide the raw data for these reports.

Meat testing, a particularly important feature of the program, enables the grocer to accurately calculate how many

portions he can cut from a large chunk of beef. In addition, since wholesale prices of meat change weekly, or even daily, the program immediately calculates the new price the grocer should charge the consumer.

Abromson explains that a separate program is necessary to manage the perishables department since these products are sold by "tonnage, that is, by the pound instead of by the unit."

Supermarket Data Systems can be reached at P.O. Box 398, Auburn, ME 04210, (207) 784-6497. —Cheryl Goldberg

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CIRCLE 129 ON READER SERVICE CARD

First Look: Eagle's Turbo XL With Post-IBM BIOS

Eagle switches chips and adds power and speed with an 8086 in its reconfigured \$4,995 hard-disk compatible

BY ROBIN WEBSTER

LOS GATOS, Calif.—About 3 months ago, West Coast PC maker Eagle Computer heard the sound of IBM's legal fist rapping on the door. The complaint was that the BIOS (basic input-output system) code used in Eagle's IBM-compatible personal computers infringed IBM copyrights.

Although the legal tangle was brief (See *PC*, Volume 3 Number 10, page 55), it did delay the formal announcement of Eagle's Turbo XL, PC-XT alternative which featured the Intel 8086—but which also contained the controversial ROM code. After about 6 weeks of feverish software development at Eagle, the Turbo is now available. According to the company, it contains a completely new BIOS that both passes rigorous "copyright infringement" tests and yet makes the machine even more compatible with IBM PC software than was originally the case.

Eagle's own software reviewers say all major software packages will work on the Turbo. However, a small number of programs that look for particular routines at specific

addresses in the IBM PC's ROM chip will definitely not function properly on the machine. In addition to warning Turbo customers about such products, Eagle intends to publish a list of which programs will run on the Turbo without modification and those that might need to be reconfigured in some small way before they work satisfactorily.

The standard Turbo carries the same price tag as an XT (\$4,995, display extra) and comes with MS-DOS version 2.11, BASICA (compatible with IBM's BASICA), a half-height 10 megabyte disk drive, and one 320K double-sided, double-density floppy drive.

There are some key differences between the two machines, however. Instead of using the IBM standard 8088 chip (which processes data in 16-bit chunks internally but has to cope with data transfers 8 bits at a time), Eagle decided to opt for the full 16-bit 8086 as the CPU.

Speed-O

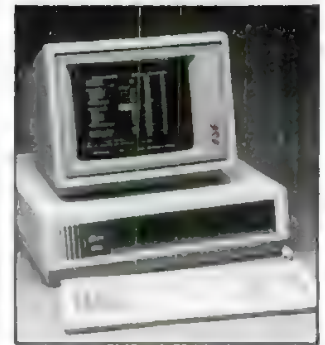
A special button set into the front of the system unit allows the user to set the 8086 operat-

ing speed either at 4.77 MHz (8088 speed) or 8MHz. The slower speed—achieved by inserting "wait" states into the 8086's normal CPU cycle time—makes it possible for the Turbo to handle IBM PC programs that are time-sensitive; the faster speed allows the Turbo, in some situations, to handle processing tasks almost twice as quickly as the IBM PC or XT. For those programs that don't care, CPU speeds can be changed repeatedly during the processing of a worksheet or creation of a pie chart.

Also, rather than just going along with the general design concepts of IBM's hardware, Eagle has included, among other things, seven proprietary PLAs (programmable logic arrays) on the Turbo XL motherboard. Standard main memory is 256K, expandable to 512K, and there are a total of eight circuit board slots, three or four of which will be taken up by basic necessities like the disk controller.

Some nice touches are the addition of a Selectric-style keyboard with red LED indicators on all "lock" keys and, internally, wider spacing of the expansion slots. The PC-XT expansion slots are rather cramped— $\frac{1}{4}$ -inch apart—whereas the Turbo slots are set 1-inch apart. This makes it a little easier to insert or remove circuit boards and probably increases the cooling fan's ability to maintain a stable operating temperature.

All XT-compatible boards can be used with the Turbo. Unlike conventional system units, all peripheral connectors (parallel port, RS-232, monitor, etc.) are located in a special bay to one side of the casing. This is a



fairly practical arrangement, since it makes the job of connecting or removing peripheral devices less of a stretch and allows the system unit to be safely backed completely up against a wall.

Garage Visit

Since the issue of IBM PC compatibility is important—especially in this case—I went along to Eagle's Los Gatos offices to see what a prototype machine could do. While it was more like opening the garage doors and taking a peek than doing a full test drive, the results of a few straightforward tests are noteworthy (see Figure 1 for a full listing).

The old faithful compatibility tests, Microsoft's *Flight Simulator* and Lotus's *1-2-3*, loaded and ran perfectly on the Turbo, responding noticeably when the CPU speed switch shifted the machine from a 4.77MHz clock speed to the full 8MHz. (*Flight Simulator* aficionados will be interested to know that the machine-gun "bullets" move faster during the dogfight sessions.) *SuperCalc* and *1-2-3* were loaded on the Turbo and on an XT side-by-side. Just visually checking the difference between operations was enough to see that the Turbo had a definite edge.

Then, despite questions like "is this going to wipe my hard disk?", I coaxed a couple of Eagle technical representatives who were helping demonstrate the machine to run the Prime Number Test program (written in BASIC) that was used during the recent mass testing of so-called IBM compatibles (*PC*, Volume 3 Number 6).

This program loaded into Ea-
(continued)

TEST	EAGLE TURBO XL	IBM XT
Run 1-2-3	OK	-
Run Flight Simulator	OK	-
Prime Number	40 seconds (8MHz)	1 min 07 seconds
Load WordStar	6 0 (floppy)	6 2 (floppy)
	3 0 seconds (HD)	3 5 seconds (HD)
WTEST	1 min 49 sec (floppy)	2 min 46 (floppy)
	19 seconds (HD)	25 seconds (HD)
RTEST	1 min 24 sec (floppy)	1 min 28 sec (floppy)
	12 seconds (HD)	17 seconds (HD)

Figure 1: Eagle's XT-compatible, the Turbo XL, offers 1-2-3, Flight Simulator, and faster speeds than the PC-XT.

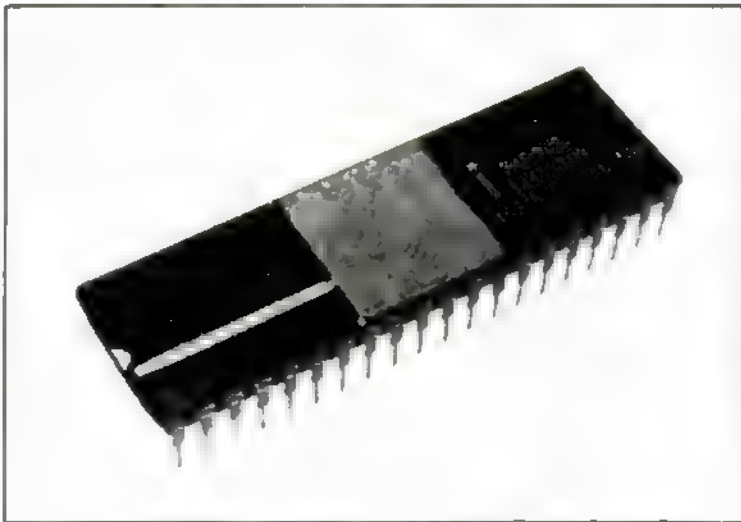
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Turbo (continued)

gle's BASICA language system perfectly and, when run, completed the test program in the quite respectable time of 40 seconds (the XT managed the same task in 1 minute, 7 seconds). No problems there.

Read and Write

When it came to the WTEST (Write test) and RTEST (Read Test) benchmark programs, the Turbo again outdistanced the XT. Writing 20 1K records to disk on the Turbo took 1 minute, 49 seconds using the floppy drive, and 19 seconds using the integral 10 megabyte drive. The XT delivered times of 2 minutes, 48 seconds (floppy) and 25 seconds (hard disk). Reading those same files took the Turbo 1 minute, 24 seconds (floppy) and 12 seconds (hard disk); the PC-XT took 1 minute, 28 seconds (floppy) and 17 seconds (hard disk).

Interestingly, two tests that sent a lot of other would-be IBM compatibles into a daze—trying to run IBM's *Diagnostics* and *Advanced Diagnostics*—just gave the Turbo a mild case of indigestion.

While both the standard and advanced diagnostic programs correctly listed the hardware installed on the Turbo when asked to do so, these programs objected when asked to take a look at the system and color/graphics adapter boards.

The error messages were the result of the PLAs and other Turbo-specific circuit design on the motherboard and non-IBM design circuits on the color/graphics board. Other tests intended to check the status of PC-XT components, including the keyboard and display, performed substantially as expected, although one of the Eagle representatives did get a little concerned when the Advanced Diagnostics system asked him if it was OK to overwrite some of the system tracks on the Turbo's hard disk.

Obviously, all this preliminary data adds up to the fact that the Turbo XL is a very IBM-compatible machine that can provide users with some worthy extra features for the same starting price as an XT. ■

Peachtree Puts 25 More Software Packages Into Its PC Product Crate

Prize package is judged to be integrated, \$625 Decision Maker

BY KAREN COOK

ATLANTA—Peachtree Software, in what it termed "the biggest rollout by a single company ever," has introduced 25 new software packages for the PC, PC-XT, or PCjr.

The company's prize product is *Decision Manager*, an integrated package for the PC or XT that sells for \$625. *Decision Manager* uses Peachtree proprietary windowing software and includes a word processor (compatible with *PeachText 5000*, a more sophisticated package), spreadsheet, telecommunications, presentation-style graphics, a report generator, and a built-in mainframe link.

The mainframe link technology, which emulates 3270 mainframe terminal, was developed by Peachtree's parent company, Management Science America (MSA), a mainframe software vendor. MSA also sells *Executive Peachpak II*, a mainframe-to-micro link product

that it is already shipping.

MSA has also formed a new division to distribute microcomputer software to Fortune 1000 companies, but none of Peachtree's newest releases will be included in that marketing scheme.

Although Peachtree has kept a low profile in the software industry, the Atlanta-based company's growth has been steady. Peachtree now offers more than 50 products, sales have increased from \$3.3 million in 1981 to a projected \$35 million this year.

"Peachtree's long-term strategy is to build brand-name recognition," says Alfred R. Berkeley, a managing director of Alex Brown & Sons in Baltimore. "With MSA's resources behind it, it doesn't have to depend on a single blockbuster product," he explains, the way that Ashton-Tate and Lotus Development have relied on *dBASE II* and *1-2-3*.

In addition to *Decision Manager*, Peachtree's new productivity offerings include *PeachPlan*, for the office, and the *Home Software Library*, a seven-package sampler composed of Peachtree's *Home Writer*, *Home Accountant*, *Home Analyst*, *Compu-Spell*, *PRISONER Adventure*, *BASIC Tutor*, and *Compu-Read*.

Peachtree beefed up its educational line with two multi-volume series—*Writing Skills* and *Learning to Read*—as well as several educational games and an SAT practice package. The *Learning to Read* series works with a speech board so that young children can hear the way that words sound.

In accounting, the company added a five-part *Back to Basics Accounting* series written by a Harvard professor.

Most of the software offerings will cost under \$100, and will be available either individually or in discounted sets. ■

Commodore Launches PC-Compatible Abroad

HANNOVER, West Germany—Commodore International, Ltd., has introduced its first IBM compatible computer—a Hyperion lookalike—at West Germany's Hannover Fair, Europe's largest computer show.

The West Chester, Pennsylvania, company also showed an unnamed, 16-bit, UNIX-oriented machine with a Z8000 microprocessor. Both machines are aimed at the office market rather than the home, Commodore's traditional territory.

The announcements came as no surprise to Commodore watchers. The 8088-based Commodore PC is built according to designs that Commodore

recently licensed from the Canadian manufacturer of Hyperion, a transportable IBM-compatible machine. Since Commodore also has a license to produce the Intel 8088 chips that drive IBM's PC, the company has been expected to begin production of an IBM-compatible computer (See *PC*, Volume 3 Number 8, page 52).

Experts expect Commodore to sell its PC first in Germany, where it has over half the personal computer market, according to *Markt News*, a German microcomputer market newsletter from M&T Publishing in Cupertino, California.

Unlike Commodore, IBM

has had difficulties in marketing its PC overseas. The documentation and German character generation were greeted with dismay when IBM introduced the German PC in January, 1983, *Markt News* reported, and sales have been sluggish since. Recently, IBM announced a price cut of about 20 percent on its personal computers throughout Europe (See *PC*, Volume 3 Number 8, page 57).

Commodore gave no details on prices or release dates for either of the new business machines, but some experts speculate that Commodore may release a compatible in the United States as early as October.

How closely will the new models resemble the Hyperion? "If it is released in the U.S., you can bet there will be some improvements," a Commodore spokesperson said. ■

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CIRCLE 385 ON READER SERVICE CARD

PC Software Tackles The Olympic Records

Learned-Mahn links IBM-donated PCs to Olympic Committee's mainframe database

BY KAREN COOK

BOISE, Idaho—Every Olympics has a thousand stories of athletes reaching new heights of endurance and achievement.

At the heavily computerized Summer Olympics in Los Angeles, there will also be tales of hardware and software striving together for administrative gold medals.

One of the standouts in the accounting competition is Learned-Mahn Software, a small Boise-based software firm. In 1980, the company made one general-ledger accounting package that ran on General Electric (GE) mainframes. Now, the company's customized software links the

GE mainframes to PCs and produces financial statements for the Los Angeles Olympic Organizing Committee's top management.

In addition, Learned-Mahn software generates monthly "commitment" reports that compare projected costs to actual expenditures at over 100 "cost centers"—the unglamorous accounting term for "Olympic events."

"This is the first Olympics that's not being subsidized by any government, so if they want to break even, it's especially important that they use a tightly controlled, underlying accounting system," explains Learned-

Mahn president Gary Mahn.

The Olympic Committee first made contact with Learned-Mahn in 1980. "They chose us partly because we had a personal relationship with someone from Arthur Young who was on the committee," Mahn says. The then 1-year-old company's package was particularly appealing because it ran on a time-sharing system on GE mainframes. "All you needed to use it was a terminal hooked up to a telephone," Mahn says. At the time, the Olympic Committee wasn't ready to invest money in expensive computer hardware of its own.

When IBM donated \$10 million worth of PCs and software to the Olympic Committee in 1982, everything changed. Microcomputers were everywhere, and everything was being automated. (See "The PC Goes For The Gold," *PC*, Volume 3 Number 4.) "The Olympics went from a small business to a large one overnight," Mahn says. "We had to convince them we could still do the job."

After 4 months of custom programming and massive revisions to the original product by three full-time programmers, Learned-Mahn devised a system that used PCs as smart terminals for intelligent data entry, data editing, and report listing. The huge Olympic database that feeds the PCs is still stored in a GE mainframe.

Mahn is so pleased with the system that he wants to sell it to other Olympic Committees. "We've got our eyes on Olympics in Canada and in Seoul, Korea," he says. "With GE remote computing, you can pull in data from 150 locations and send it anywhere."

"We were a small, unknown company that happened to be in the right place at the right time," Mahn says. The company now has several million dollars in sales. Mahn hopes new PC products and software customization will double that figure annually. Like many athletes, Learned-Mahn came to the Olympics as an amateur and will leave it a pro. ■

Oracle and Intellect Speak to Large and Small Computers

Database and query systems to run on both micros and mainframes

When you realize that dozens of people in a crowded room are speaking different languages, there are two solutions. The easiest route to communication is hiring a squad of translators. Another solution, though it takes longer, avoids any intermediary: you teach everyone to speak the same language.

Faced with a similar situation at the meeting of micros and mainframes—which weren't designed to communicate with each other—several vendors have developed software that translates mainframe code into a form that can be read by microcomputers. (See "Growing Demand Spurs Mainframe-to-Micro Links," *PC*, Volume 3 Number 7, page 49.)

An alternative solution has attracted less publicity, but it may be the logical way of the future. At least two companies—Ora-

cle Corporation of Menlo Park, California, and Artificial Intelligence Corporation, of Waltham, Massachusetts—have recently moved mainframe software down to the PC. In effect, they have created software that speaks the same language on small and large computers.

Oracle Database

Oracle Corporation's *Oracle* is a relational database manager, compatible with SQL, that's written in C language. SQL, according to Oracle president Larry Ellison, is the highly sophisticated language developed by IBM for its new generation of easier-to-use relational data databases, SQL/DS and DB 2. These databases present information in an easier-to-use table format.

"Instead of designing *Oracle* specifically for microcomputers

in the late 1970s, we decided to wait until microcomputers got powerful enough to run it—and now they are," Ellison says. Since microcomputers have as much processing power as mainframes had 10 years ago, some software now runs nearly identically on small and large machines.

Oracle's software runs under a variety of operating systems, including VM/CMS and MVS (mainframe systems) and UNIX. Eventually, Ellison says, Oracle may introduce its database manager in a stand-alone version for the PC.

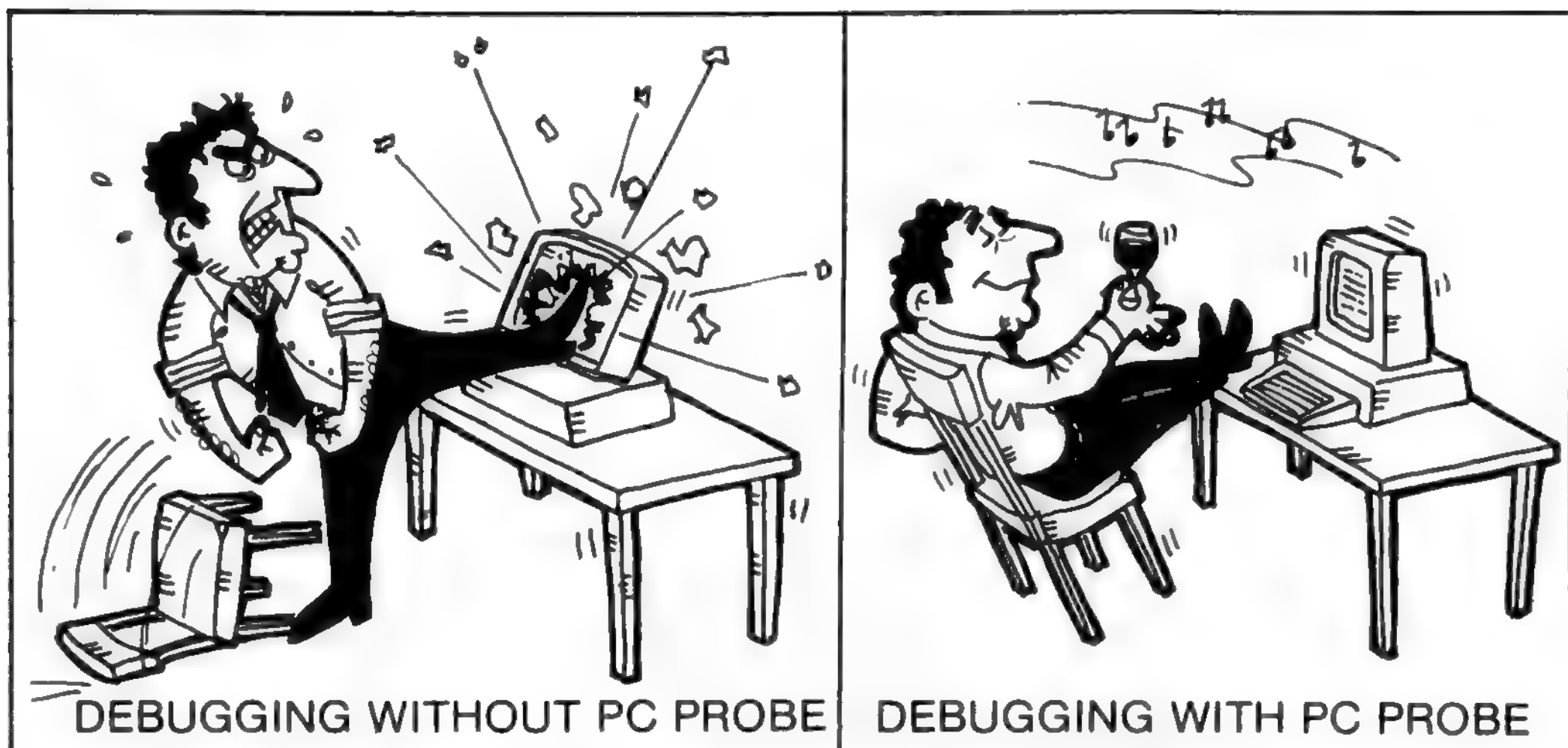
Natural Language

Artificial Intelligence Corporation's (AIC) *Intellect* is a natural-language query system that allows users to request information from mainframe databases in nearly con-

versational English. Such simple language systems, experts say, could help answer one of the major criticisms of mainframe database software—namely, that it is too complicated for nonprogrammers to use. IBM, which recently licensed *Intellect*, has taken ads in the *Wall Street Journal* to promote it for its 308X, 4300s, and System/370 mainframes.

Meanwhile, AIC has introduced its own, enhanced version of the product, called *Intellect Micro-to-Mainframe Link*. With this, if someone types "How many administrators do we have?" into the *Intellect* program running on the PC, the question is relayed to an *Intellect* program running on the mainframe. The requested number is extracted from the database, then sent back to micro, where it may be integrated directly into specially designed spreadsheet or graph programs.

This summer, AIC is expected to announce this natural-language inquiry capability for the PC. ■



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PRODUCT REVIEW

When So-so Programs Happen to Good People

BY MARK MALAMUD

Life-Style Analyzer

Eagle Software Publishing
Suite 405
993 Old Eagle School Road
Wayne, PA 19087
(215) 964-8660

List Price: \$34.95

Requires: 128K RAM.

Are personal computer enthusiasts ready for psychiatric and quasi-medical self-help programs? Well, ready or not, here they come.

Eagle Software recently entered the digital self-help arena with its *Life-Style Analyzer*, which is part of what the company calls the Personal Enrichment Series.

The *Life-Style Analyzer* (LSA) is a modified version of a Personal Health Inventory program produced by American Corporate Health Programs, Inc. for executives of Fortune 100 firms. The LSA is a rather straightforward program that asks you a series of mostly multiple-choice questions about your "life style, health habits, activities, medical history, and family background." It then compares your answers and statistics from the U.S. National Center for Health Statistics and the U.S. Public Health Service to show how you stack up to the average. It has data for males and females between the ages of 10 and 74.

Regrettably, the program does not live up to its exhortation of "Be happy...Stay healthy...with *Life-Style Analyzer*." There are problems in both the inventory and analysis sections of the package.

Choices, Choices

About halfway through the program's health inventory I found myself having greater trouble taking its queries seriously. This was owing to a bar-

rage of bewildering multiple-choice questions. For "Do you carry a weapon?" the LSA offers you the following choices: 1) Yes, 2) No, or 3) Skip it. Huh? What does "skip it" mean? For the "Status of your last chest X-Ray?": 1) Normal, 2) Abnormal, 3) Neither, and 4) Don't know. And for female users (in one of the program's few significant examples of branching), it asks, "Have you given birth to any children?" Your choices: 1) Yes, 2) No, 3) Don't know, or 4) Skip it. *Don't know?*

Once through with the inventory, the LSA goes on to analyze your responses and to evaluate your "overall risk," that is, the chances of someone with your "life style" dying within the next 10 years. The analysis lists the most frequent causes of death for your age, sex, and race; then the LSA shows you how your risk compares to the average. Finally, it predicts an achievable level of low risk for you if you follow the program's recommendations for improving your living habits.

Ailing Alter Egos

To get a feeling for the full scope of analysis the LSA could produce, I answered the inventory first as myself, then as several superindividuals with no backgrounds of illness and no current health risks, and finally as several variously unhealthy individuals. While the analysis for myself and my superhuman alter egos was relatively unenlightening, the life-style analysis for my ailing alter egos raised some questions about the LSA's design.

For example, the alter ego with the most disorders was told the chances were 152,246 out of 100,000 of his dying within the next 10 years—meaning, I can only guess, that not only is his

own fate sealed, but also that it is dangerous to even hang around someone with symptoms as severe as his.

Another one of my selves professed to *having* cancer of the stomach, but this did not affect his chances of *dying* from cancer of the stomach.

Finally, a relatively healthy alter ego was told that his chances of dying from cancer of the lower bowel over the next 10 years was 7,104 out of 100,000, but that by following the recommendations of the LSA he could lower his risk to 286 out of 100,000. This seems a substantial drop and one that I wish the program would have explained in more detail in the health recommendation section of the analysis.

Unfortunately, the recommendations the program does make to help you "Be happy...Stay healthy" and reach "achievable" levels of risk are uninformative and self-evident. For those who smoke more than 40 cigarettes a day, it suggests smoking zero cigarettes a day. For those who drink more than 40 alcoholic drinks a day, it suggests reducing consumption to zero. And for those who do not have regular proctoscopic exams, it suggests having them annually. Not very helpful. Furthermore, although the LSA tells you the changes that need to be made, it doesn't tell you how to

achieve them.

From a hardware point of view, I tried the program first on an IBM PC-XT with a color monitor. The directions for the LSA's use were very clear; however, Eagle's instructions for the XT don't tell you that even though you should transfer the entire program onto your hard disk to run, you must still keep the LSA disk in your A: drive or the program will crash halfway through. Also, while the program will run on a monochrome monitor, the LSA still describes the graphs it produces at program's end in terms of their different colors. I had no problem using the LSA on a regular IBM PC.

Lack of Confidence

In general, the entire LSA has a slightly shoddy feel that inspires neither confidence in its advice nor, consequently, a desire to initiate change in one's life style. I was further disenchanted with the program's spelling mistakes and inconsistency in "voice" as it moved between that of a second-year medical text (speaking offhandedly of "proctoscopic exams" and "bacterial" vs. "viral pneumonia") to that of a fifth-grade picture book (needlessly describing the esophagus as the "food tube"). Along with the uninspiring graphics the LSA offered, I had a gnawing suspicion that the program had been dashed off in a day or two to capture a new self-help market for personal computers.

I don't mean to condemn Eagle Software. The LSA is a fine idea whose time has simply not yet come for personal computers. The disclaimer that the program is "by no means intended to replace expert medical

(continued)

Speaking of Computers: What If Chips Beat Paper?

"If computers had been around for 4,000 years, but paper had just been invented in the 1980s, we'd be seeing things like the '3-by-5 Card Users Group' and the publication *8½-by-11 World*."

—John Bear, author of *Computer Wimp*, speaking at the West Coast Computer Faire's "Personal Computer Backlash" program

So-so programs (continued)
opinion" is painfully apparent.
Eventually, when programs

such as the *LSA* can handle a
more comprehensive history
and produce a more personal

prognosis, they may become
powerful medical tools. Right
now, however, the *Life-Style*

Analyzer doesn't seem to tell us
any more than we already know,
and for \$35 that's no bargain. ■

Calendar of Events

DATE	EVENT	COMMENT	LOCATION	CONTACT
June 12-14	Advanced Manufacturing Systems Exposition & Conference	Information systems and automated production systems.	McCormick Place Chicago, IL	AMS 84 708 Third Ave. New York, NY 10017 (212) 370-1100
June 13-15	Use of Microcomputers in Occupational Safety and Health	Seminars on how to select and use micros for safety and health data collection, analysis, and retrieval.	University of Washington Seattle, WA	University of Washington Seattle, WA 98195 (206) 543-1069
June 14-17	Cincinnati Computer Showcase Expo	Hardware and software.	Cincinnati Civic Center Cincinnati, OH	The Interface Group 300 First Ave. Needham, MA 02194 (800) 325-3300 (617) 449-6000
June 15-17	Computerfest '84	Exhibits, seminars, and hardware trading.	Dayton Convention Center Dayton, OH	Mid West Affiliation of Computer Clubs P.O. Box 24505 Dayton, OH 45424
June 18-21	The National Database and 4th Generation Language Symposia	Product-oriented discussions and seminars.	Stouffer's Inn of Westchester White Plains, NY	Software Institute of America 8 Windsor St. Andover, MA 01810
June 20-22	Project Planning, Scheduling & Control Using PCs	Hands-on workshops to help upgrade productivity and effectiveness with the help of PCs.	AMA Management Center Washington, DC	American Management Association P.O. Box 319 Saranac Lake, NY 12983 (518) 891-0065
June 21-24	Boston Computer Showcase Expo	Hardware and software.	Hynes Auditorium Boston, MA	The Interface Group See above
June 25-27	Personal Computers & Networking	Seminars for developing strategies for using and selecting PCs.	Detroit-Plymouth Hilton Inn Plymouth, MI	Center For Advanced Professional Education 1820 E. Garry St. Suite 110 Santa Ana, CA 92705 (714) 261-0240
June 26-28	PC Expo	IBM PC and compatible trade show.	New York Coliseum New York, NY	PC Expo 333 Sylvan Ave. Englewood Cliffs, NJ 07632
June 28-July 1	Milwaukee Computer Showcase Expo	Hardware and software.	MECCA Milwaukee, WI	The Interface Group See above
July 9-12	1984 National Computer Conference	Hardware, software, and seminars.	Las Vegas Convention Las Vegas, NV	AFIPS, Inc. 1899 Preston White Dr. Reston, VA 22091 (703) 620-8940
July 11-12	Personal Computer Local Network Seminar	Seminars on the developments in the personal computer local network market.	Hyatt Regency San Francisco, CA	Architecture Technology Corp. P.O. Box 24344 Minneapolis, MN 55424 (612) 935-2035

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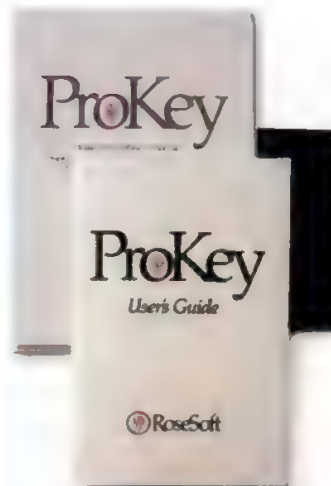
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CIRCLE 438 ON READER SERVICE CARD

Talk Show Hosts Ask: How TV-Friendly Are Computers?

Computer manufacturers try new medium with mixed ratings, responses

BY JEFFREY LENER

NEW YORK—Being sick and staying home in bed watching television may offer no relief from personal computers. PC users report micros are increasingly showing up on TV talk shows.

"Everybody's really into the computer age," says Michael Katz, producer of WABC's "The Morning Show" in New York.

While that may be true in the Big Apple, stations in smaller ADI's (Areas of Dominant Influence) apparently have less demand for shows dealing with computers and consumer electronics, and consequently shy away from them.

Even shows that are receptive to these topics often provide only narrow coverage. Because these programs often fall under the auspices of a station's news department, they require an element of controversy, or specific rather than personal newsworthiness.

"There has to be a hook somewhere," says Barbara Uttley, public affairs director of KING in Seattle. "Something other than just 'They exist and here they are.' " If viewers' interest is aroused about computers and an impression is left, they may go out and further explore the market on their own.

Many programs about personal computers are geared toward disseminating consumer information. Producers of those shows prefer guests to have a broad knowledge of the field

and to approach the topic in an unbiased, objective way. Pat Arthur, producer of KOMO's "Weeknight" in Seattle, says "The thrust of the segment is to be a service for the viewer. We just inform, we don't judge."

Too often these attempts to enhance consumer understanding will only leave viewers more baffled. Most viewers are turned off by technical jargon, and prefer layman's language. Complicated concepts can still be couched in simpler terms without losing their meaning. Consumer reporter Bree Walker of KGTV in San Diego suggests that guests "simplify their talk to a level that keeps people's interest, but still gets information across."

Spring Asher, producer of WXIA's "Noonday" in Atlanta, claims that although there is a discernible demand for programs of this type, they have not yet found a way to do them successfully. Consumer electronic products "may be user-friendly, one-to-one", says Asher, "but they're not TV-friendly."

Producers are wary about the interest generated by computer-oriented segments, but their biggest concern is that their programs will be used as platforms for shills with vested interests. "Some people have been experts at getting on talk-shows and turning them into commercials," warns Jules Moreland, program director of KFMB in San Diego. "We try to ferret them out."

Book to Computers: Drop Dead

The Unofficial I Hate Computers Book

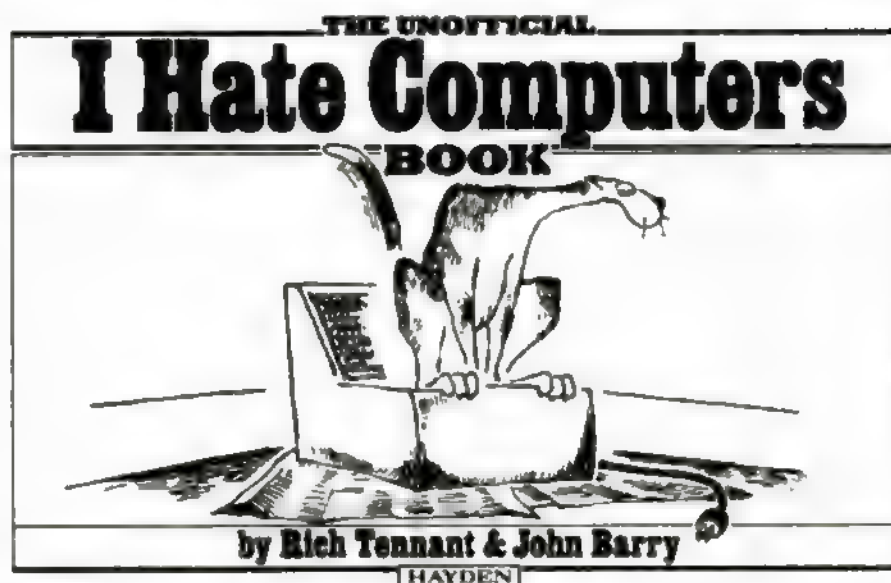
Rich Tennant & John Barry

(Hayden Book Company, Inc., Hasbrouck Heights, NJ, 1984)

80 pages; paperback; \$4.95

As a confirmed computerphobe, if it buzzes, burps, or beeps, I want nothing to do with it. I don't believe computers are designed to save time, energy, or labor. I'm convinced all computers are part of a massive, sadistic plot to bamboozle hapless humans into thinking they're working less when actually they're working three times as hard as they did in their BC (before computer) days—driving them to early nervous breakdowns.

Imagine my delight when I came across *The Unofficial I Hate Computers Book* by Rich Tennant and John Barry. True computer haters, Tennant and Barry have worked with the miserable machines, but survived the experience. Tennant was a programmer in a former life, while Barry is the managing editor of InfoWorld Books, and he regularly takes computer lovers to task in his Computer Illiteracy column for *InfoWorld*.



Together, they have combined vitriol with creativity to produce a delightful collection of cartoons revealing the vengeful thoughts lurking in the hearts of computer users everywhere. And, if you haven't already guessed, the book plays on the popular *101 Uses for a Dead Cat*.

What I like best about *The Unofficial I Hate Computers Book* is the fiendish new uses Tennant and Barry find for the loathsome little boxes: a high-tech bird feeder, a kitty litter box, a pair of matching bookends (for all those manuals no doubt), a state of the art cutting board to use while waiting for your mother's meatloaf recipe to flash onto the screen. What about a striking new chopping block for those who favor wood stoves, a really novel fondue or stock pot, or a fancy new mailbox? Or, for dog lovers who live with pooper scooper laws, wouldn't one of these little beige boxes be a striking change from the silly little plastic bags you carry around?

The problem with reviewing a book of cartoons is the same as reviewing a comedy—you risk giving away the best jokes. Suffice it to say that Tennant and Barry offer cartoons to amuse not only confirmed computerphobes who have never fingered a keyboard, but also those poor souls who must spend every day working with computers and have come to despise them.

—Susan Hurley

PC Search Aid

For anyone who's racked their brains to recall which issue of which magazine they saw a certain PC article in, there's now an

index to ten of the publications devoted to the IBM PC and compatibles.

PC Abstracts, compiled by Walter A. Gaber, lists articles from magazines such as *PC*,

BYTE, and *Softalk/IBM*. The index includes each article's title, author, issue and page numbers, and a synopsis. There's an extensive table of contents and an author and subject index.

Gaber plans two issues of *PC Abstracts* this year. A copy costs \$16.95 and is available from Walter A. Gaber, *PC Abstracts*, P.O. Box 1058, Jenks, OK 74037, (918) 299-5323.

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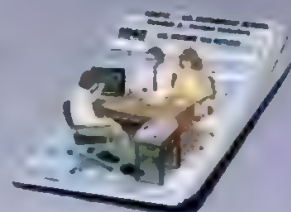
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CIRCLE 312 ON READER SERVICE CARD

People in the News: Stewart Brand

Will software sequels to Brand's Whole Earth Catalog again play a culture-changing role?

BY JAMES LANGDELL

SAUSALITO, Calif.—To many people in the 1980s, personal computers are the entire world. One sign of this is that Stewart Brand, originator of the *Whole Earth Catalog*, is now editor-in-chief of the *Whole Earth Software Catalog*, to be published in October by Doubleday.

Certainly, Brand's much-publicized \$1.3 million advance from Doubleday might seem enough to motivate anyone to start a new career. On the other hand, it's a natural step in the evolution of Brand's vision of individuals using computers, an idea he's explored in print for more than 15 years.

Whole Earth Heritage

In March 1968, Brand had an idea that could help his friends "who were starting their own civilisation hither and yon in the sticks." He realized that many of their problems "came down to a matter of access." They needed to know "where to buy a windmill. Where to get good information on beekeeping." And, Brand added at the time, "Where to lay hands on a computer without forfeiting freedom," which then meant getting cheaper late-night access to remote time-shared computers. Brand decided to pass on word of reference works and sources of tools through a catalog that would be "continuously updated, in part by the users."

Brand published the first issue of the *Whole Earth Catalog* in October 1968: He printed 1,000 copies of that 64 page tabloid-sized volume. As soon as the catalog appeared, letters poured in from people who wanted to share information, sometimes to correct and improve on the catalog's entries about raising goats, building TV equipment from scrap, or practicing Zen meditation.

Each year, Brand passed on information while it was fresh

by publishing two updated *Whole Earth Catalogs* and four *Supplements*.

Walkaway Success

As the *Catalog* became more and more successful, Brand announced in 1969 that the project would deliberately self-destruct in 1971: "Stop a success and see what happens. Experiment with coming and going." When *The Last Whole Earth Catalog* appeared, as promised, it contained 446 pages written by countless contributors, and sold 1,600,000 copies.



Computer Access

Even in 1971, the *Whole Earth Catalog* contained two dense pages of information about computers. At that time, the most "personal" machines the catalog could recommend were programmable desktop calculators: the Hewlett-Packard 9100A (\$4,400) and the Wang 370 (\$4,700). By 1975, the *CoEvolution Quarterly* (started in the wake of the "last" catalog) regularly featured articles about computers and the new, affordable microcomputers.

How well has *Whole Earth Catalog* tradition carried over into the new software catalog and magazine, which deal with a subject that was a mere sliver

in even the 1980 edition's 608 pages? The first issue of the *Whole Earth Software Review* has, at first impression, a different style than its namesake. It's in color and it's digest size: far smaller than the legendary catalogs—and smaller than any other computer magazine. Why did Brand choose this size?

Brand says that the small format "takes advantage of our major peculiarity: We don't carry advertising. A lot of people say 'It's a very nice. I can carry it around in my pocket. I can put it on a regular shelf.'" Brand says that the response has been very positive, but "actually some people have said 'You guys are going slick with color, just like *Readers Digest*. It makes me vomit!'"

Will the *Whole Earth Software Catalog* attract as wide a range of contributions as the past catalogs? (Most of the articles in the first issue of the magazine were written by its staff.) Brand says that people had responded "generously, and a lot of it is quite good. We'll wind up using people by the score." As with the *Whole Earth Catalog*, "there'll be a multivoiced quality to the book."

Continuing Legend

Brand notes that "people are communicating with us because of some fellow feeling. Quite a lot of people in the personal computer business and the computer-enthusiast sector of the population turn out to be old *Whole Earth Catalog* users, so I guess that legacy is working for us."

Appropriately, many reviews haven't reached Brand through the mail—they flow from readers to Sausalito through electronic networks. The EIES network (see "Computer Conferencing With EIES" in PC, Volume 1 Number 9) has a *Whole Earth Software Con-*

ference on 1031, CompuServe's menu trees offer a GOWEC command, and Brand's catalog has a Source Mail box number.

Evolving Volumes

Has Brand again set a date for his catalog to self-destruct? "No, we haven't. Maybe we're less impetuous than we used to be. But, as the field continues to expand and take off in interesting directions, it looks like it will be fun to try to keep up with that. As it is, our deal with Doubleday is to do three editions in 3 years—so that's 3 years right there."

"As far as Doubleday is concerned," Brand says, "we're making good use of its money not only to set up our own research operation, but to set up the magazine—a public research operation, in a sense."

Brand's software publications are entering a market that is certainly competitive, but to many already seems overcrowded. "The *Whole Earth Catalog* never really hit any competition as a comprehensive how-to-do-it collection," claims Brand.

The quarterly *Whole Earth Software Review*, however, faces far more competition from scores of other computer magazines. What's Brand's strategy? "Our internal approach is to not focus on the news so much, because there are so many magazines that are doing a good job at that—including yours. We should go do something else that we can do well."

"We focus on the *good* rather than the *new*—which means we look at how something that's new fits in with what is already known to be good in its field."

"It's called competing. And the way to compete is not to compete. My training is as a biologist," explains Brand, "so I'm just trying to find ourselves a niche that's not already occupied." ■

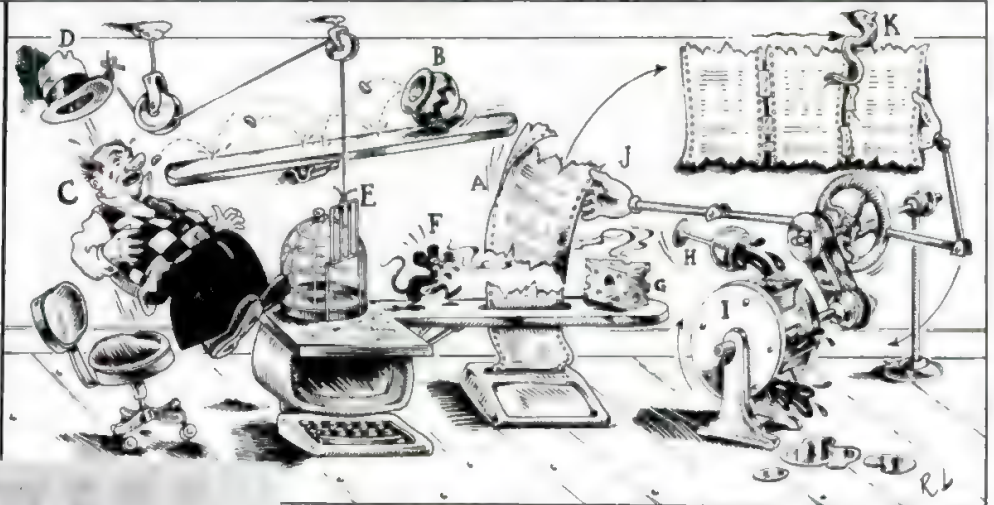
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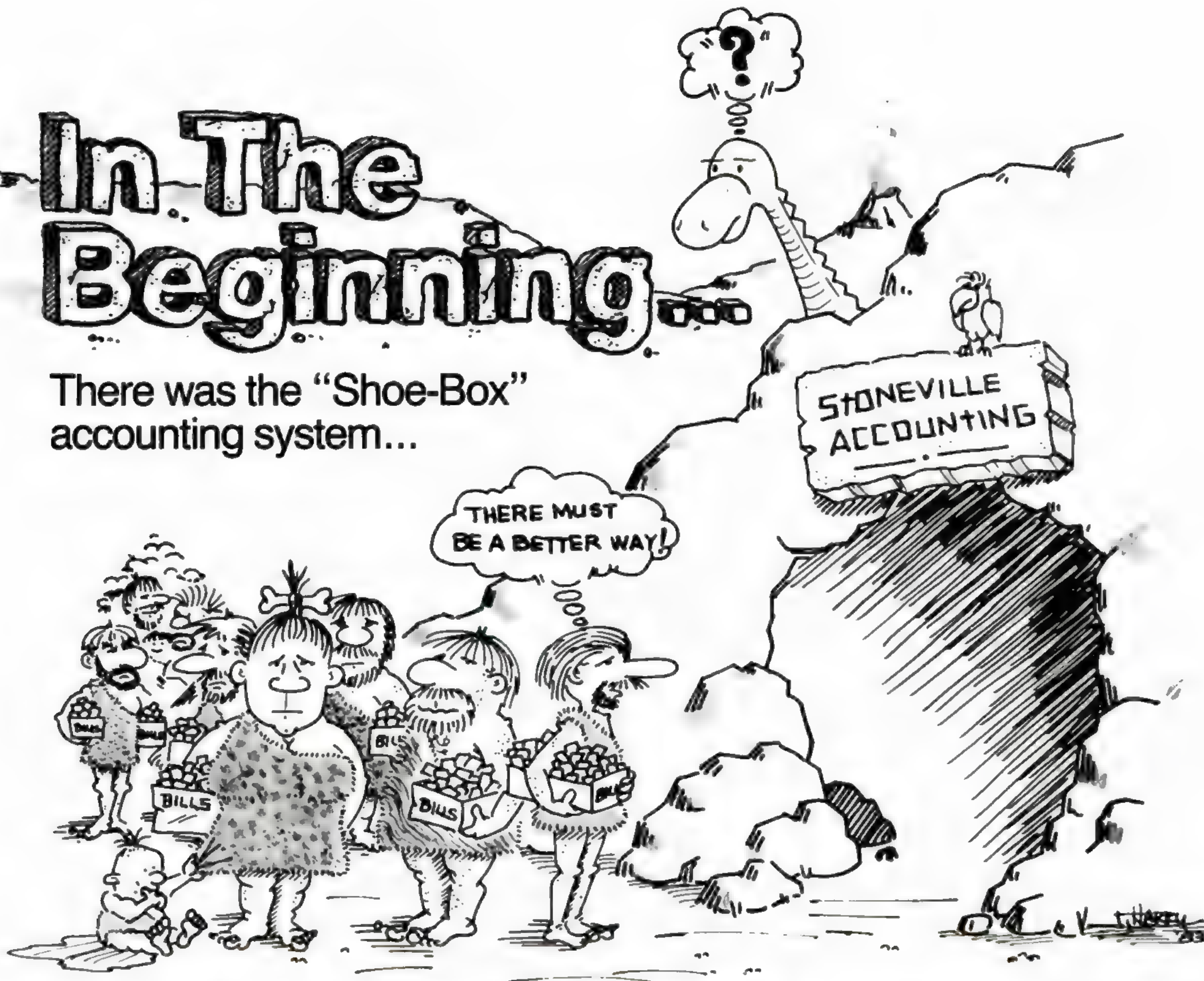
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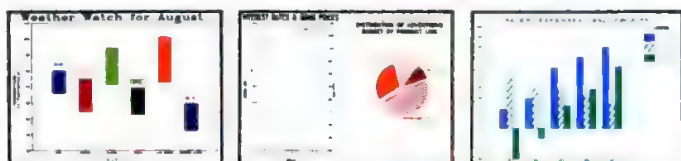
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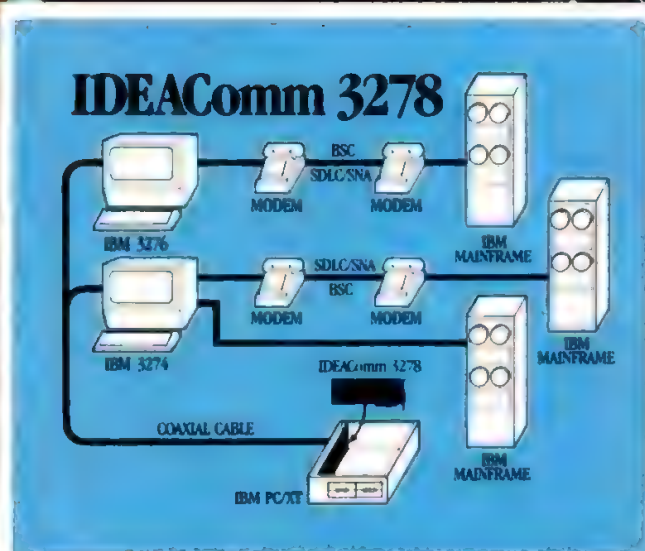
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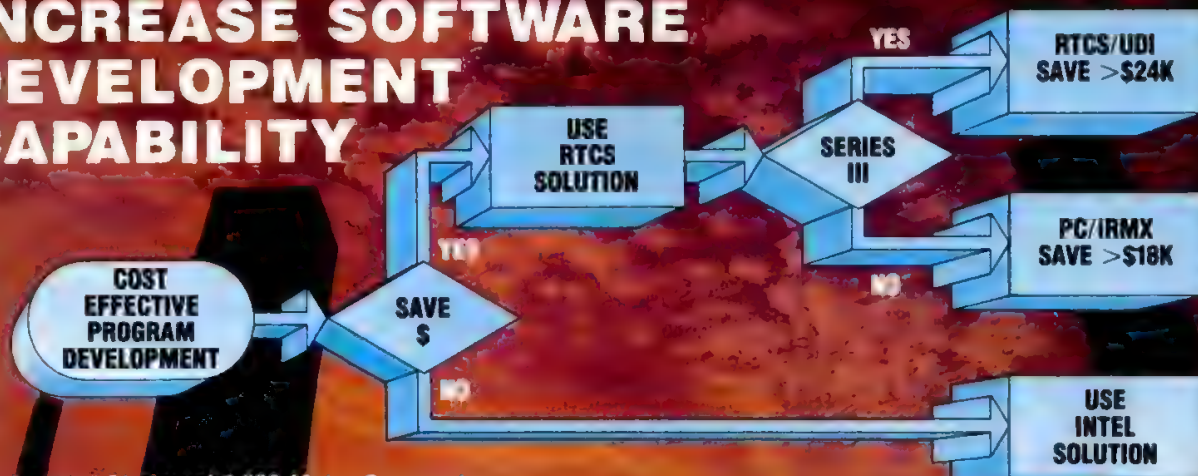
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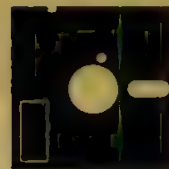
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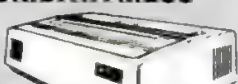
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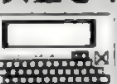
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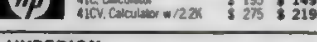
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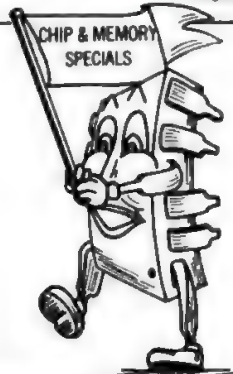
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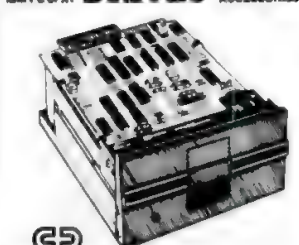
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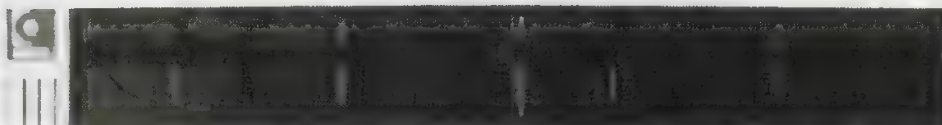
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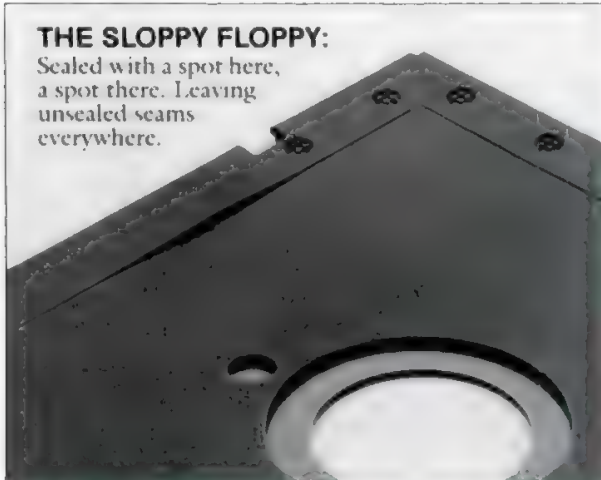
Pens, pencils, fingernails—even a four-year-old's, like Herbie—can catch and snag in those wide open spaces.

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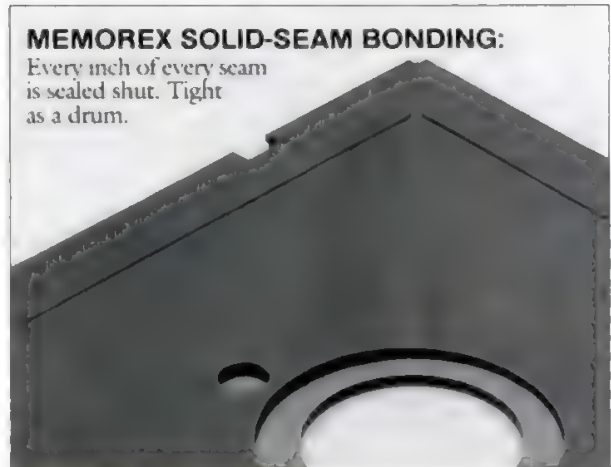
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To resist all the things that can jam your drive, ruin your drive head, or lose your data.

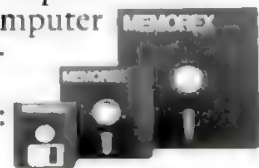
Which proves that a Memorex floppy disc isn't equal to all the others. It's better.

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Computers Tonight

Like the New Hollywood of the late 1960s, the computer industry is undergoing a critical period in its development. Imagine a television show devoted to celebrating the transition.

Suave Adam Osborne announces the "Chapter 11," a new machine that has industry leaders scratching their heads. Bill (Blaster) Budge goes Broadway in a Big Blue way. And sexy Esther Dyson polishes her crystal ball. It's all on Computers Tonight for Monday, April 1, 1989. (Theme music . . .)

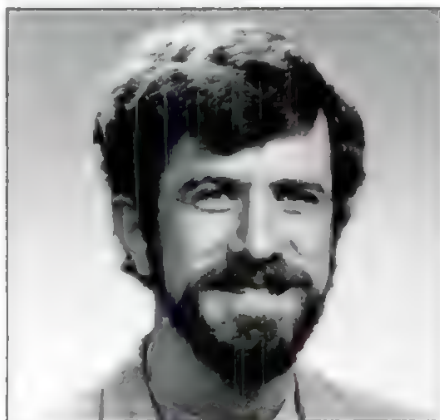
As I lurched through the exhibits at the 1984 Softcon show carrying a load of useless promotional literature sufficient to paper the roof of the Superdome and a couple of oyster bars, a weird feeling of *déjà vu* kept pursuing me. Somewhere, somehow, I'd seen this all before.

Or was it just New Orleans? When I'd first set foot in the French Quarter, 10 years ago, I felt I'd *been there before*—though I knew I hadn't. After coming close to abandoning my cherished disbelief in psychic phenomena, I finally figured it out: Those filigreed balconies imprinted in my brain were remnants of my visits to the "New Orleans Square" so charmingly recreated at Disneyland.

But my current *déjà vu* remained a mystery until the end of the conference, when I stumbled into a well-heeled software company's big blowout. "Bayou Boogie" or some such thing had invaded the ballroom of a swank hotel with dangling kudzu, flowering magnolias, and (though I may be deciphering my fuzzy notes somewhat inaccurately) a catch-it-

yourself pond where people in bibs were bobbing for crawfish.

Amid huge tables groaning with savory delicacies, beer, and overflowing vats of hand-whipped Irish coffee cream, corpo-



Stephen Manes

rate bigwigs practiced the smug, cocky poses best underpinned by infusions of millions of dollars of venture capital. Software gurus departed with idolatrous members of the press for personal and exclusive interviews.

The band broke into a first-rate rendition of "San Antonio Rose" and I took a soberly objective swig of my Lone Star as an acne-scarred young exec, clearly impressed with the grandeur of it all, sauntered over. After some desultory opening conversation ("It's amazing how fast this

field is moving"), he suggested that "video games make people think better."

Déjà vu! Been there already! Hollywood, 1969!

This young Immanuel Kant's line back then would have been "The cinema is the art form of the twentieth century." In the late 1960s, all hell broke loose in Hollywood, and it was called *Easy Rider*. Almost impossible to watch today, the film cost peanuts to make and raked in millions. To movie moguls, the combination had an undeniable appeal.

Suddenly veteran directors and big, expensive spectacles were out. Studios stumbled over each other in their rush to toss money at untested Wunderkinder that they hoped would create monster-grossing "youth films" on flea-size budgets. The new talent came in part from "independent filmmakers" who had used improving 8mm and 16mm film technology to produce homebrew flicks of decent, if not studio, quality.

Hundreds of bright young phenoms suddenly found Hollywood the place to be. The Great American Film supplanted the Great American Novel. Aesthetes who might formerly have looked down their noses at Lotusland and spent their entire lives in the dull respectability of some college English department, suddenly embraced film with a religious fervor. Newly minted film schools supported serious

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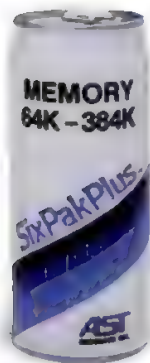
SixPakPlus has been engineered to meet these needs at a competitive price while maintaining AST's high standards for quality and reliability.

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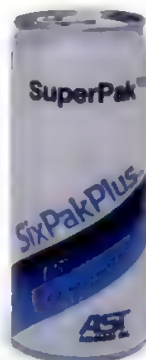
3. One Parallel (printer) port, configurable as LPT1 or LPT2 (LPT2 or LPT3 when the IBM monochrome card is installed), for use with the IBM/Epson and other compatible printers. The port is compatible with IBM diagnostics.

4. A Clock-Calendar with battery backup, featuring an easily replaceable Lithium battery and a quartz-controlled timebase for a high degree of accuracy.



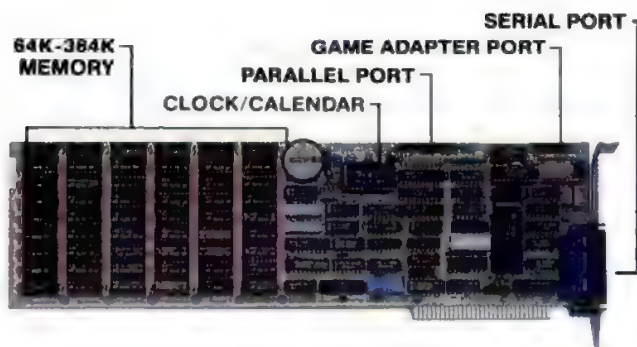
5. An optional IBM-compatible Game Adapter port, for use with an IBM-type joystick. In conjunction with application programming, this game port may be used for cursor control, in generating graphics or for playing games at the end of your work day!

6. Every **SixPak** comes with an AST SuperPak utility diskette which includes SuperDrive and SuperSpool, the most powerful disk emulator and print spooler software you can get. These programs will greatly enhance the throughput of your PC or PC-XT by emulating disk drive and printer access at RAM speeds rather than the normal slower speed of mechanical devices. SuperPak is the first of such software to be compatible with both DOS 1.1 and DOS 2.0.



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CIRCLE 101 ON READER SERVICE CARD

studies of B-movie directors. Here was an art form, all right, and better yet, one where you could make a buck.

Alas, what Hollywood wanted, and got, was a slew of *Easy Rider* clones. A few actually took in some money, but none came close to duplicating the success of the original. Some of the young wizards, such as George Lucas, Francis Coppola, and Jack Nicholson, went on to greater fame, but eventually Hollywood gave up on the "youth movement" and went back to experienced directors, big-name stars, and big-money projects.

As inflation made even low-budget filmmaking significantly more costly, the "biz" added one new wrinkle: heavy-duty marketing analysis designed to turn any lingering thoughts of art into cold numbers. The new New Hollywood may well be a lot more successful than the old New Hollywood was, but it's a hell of a lot less interesting.

Blue Meanie Don Estridge refused to confirm or deny rumors of the "Cheese Doodle," another in the company's successful line of "Snack Food" computers. CT has learned that the official name of the machine will be "Uncle PC."

No analogy is perfect. Still, you could do worse than to call the early hackers computerdom's "underground filmmakers," mainframe producers its "studios," and *VisiCalc* its *Easy Rider*. What else looks familiar? Well . . .

The Curse of One Good Idea: Virtually all of the young filmmakers who achieved any kind of success in the late 1960s and early 1970s were one-shots, following a single good idea with plenty of bad ones. The pattern was for a successful director of a low-budget film to then make an expensive, pretentious flop. How do you top *Easy Rider*? Or *VisiCalc*? Put it this way: What do *The Last Movie* and *VisiOn* have in common?

Simoleons on the Loose: Venture capitalists have to throw their money at somebody. A lot of it will undoubtedly stick to people with *some* talent—but probably not quite enough to develop the monster

hit the money men are praying for.

Revenge of the Clones: If the miles of aisles at Softcon were any indication, most of the programs currently coming to market are cloneware, offering only marginal improvement on the originals they slavish-

Hardware is interesting, but software makes it sexy.

ly emulate. Among the dozens of word processors, spreadsheets, database managers, and "integrated packages," I saw lots of useful new individual features, (such as *Jack2*'s multiple-column on-screen word processing), but no genuine breakthroughs. The only product that struck me as truly innovative was the Pascal interpreter for the Macintosh. After all, even *Symphony*, which appears to be very well thought out, is still only 1-2-3 IV. And the computer games I saw all seemed like *Bride of Pac-Man*.

The Decline of the Backyard Entrepreneur: Development and marketing have become so expensive that the one-man shop isn't going to be much of a force anymore. That doesn't mean clever, low-rent operations won't grab some mazuma. They'll just have to find special markets.

The Star System: The microcomputer business is developing its cadre of Big Names. So far, only the exceptionally savvy Peter Norton has personally parlayed stardom into real money in the IBM world. But when the industry's premier gossip columnist devotes a whole column to fast-food favorites of the stars (it came across my desk today), you know some sort of weird critical mass has been reached in the cult of personality.

CT has learned that Apple's state-of-the-art 64-bit computer will be christened "Granny Smith." As Jobs puts it, "Granny combines the best of Lisa and Mac. Some say our computers are slow. No one

will dare say that about Granny!"

The film industry is almost entirely about software. Apart from a few insiders, nobody in the business or out of it gets all that excited about the announcement of a new camera, projector, or film format.

The microcomputers industry is heading the same way. Hardware is interesting, but software makes it sexy. Nobody got all that excited about the much-touted Macintosh package in terms of its box. The important point is all the jazzy software built into it. Lap computers are neat, but when the novelty factor wears off the question will remain the same: What software can you run on 'em?

So you can bet more and more programming hotshots with some talent are going to descend on the loose change that's floating around. It sure beats sitting at a desk somewhere wondering why the boss is using Esmerelda's input module instead of yours.

You can also bet that big, well-capitalized outfits such as Lotus and Electronic Arts will get their hands on new machines before their release, giving them a big jump on the market. Hardware vendors such as IBM and Apple will be major players in software, too. And they'll all dazzle us to sleep with their ad campaigns.

But don't count out the garages and dens of the world. We may still have to look to them for the truly innovative creations, which the big boys will copy and sell to us in "improved" versions.

And the hackers? Well, as I sat in a gumboteria at the close of Softcon, a fellow I hadn't seen since my Hollywood days sat down at a nearby table. In the late 1960s he'd been one of the Wunderkinder, a major figure in the underground film movement who'd had a shot at the big time but never quite made it. Turned out he was working for one of the major software exhibitors. He had designed its booth.

CT has learned who shot Big Chip Dunkel on this year's closing episode of the hit CBS series, "Silicon Valley." (Theme music . . .)

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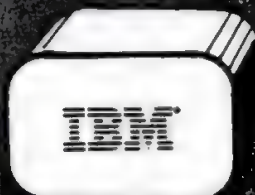
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Vert.	50-100Hz	25-180Hz	50-60Hz	45-100Hz	45-100Hz	45-100Hz
Horz.	15-20KHz	14-42KHz	15.75KHz fixed	15-33KHz	14-19KHz	14-25KHz
Min. Blanking Time	6 microseconds	6 microseconds	12 microseconds	7 microseconds	12 microseconds	7 microseconds
Projected Image Width	4'-20' var.	4'-25' var.	4.8' or 6.7' fixed	4'-5.6' var.	3.3'-8.5' var.	3.3'-8.5' var.
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The Computer Frustration Cure

Computers, the most predictable of machines, stir intense emotions when they don't work as expected. Their malfunctioning can upset us as much as the illness of a friend.

The other evening after work I ran to the bank, shoved my card into the slot, tapped in my code, grabbed a fast \$40, and held out my hand for the card. It didn't come out. I felt like taking a poke at the machine. "Give me back my card," I told it loudly.

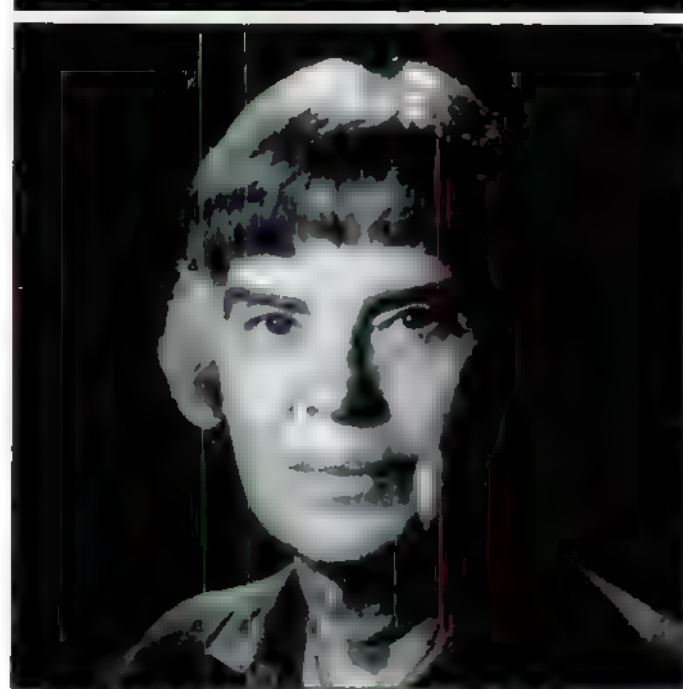
I am not a computer novice. I have my own PC; I understand its naughty habits, its kinks, and its petulant error messages. I use a mainframe at the college where I teach. So why did the bank machine make my blood boil? How can a machine that is the epitome of logic be capable of producing so much emotion?

Episodes like this evoke a flashback to one's early attacks of computer anxiety. I remember my fears that I'd break something, that I'd press the wrong button and a wisp of smoke would curl up out of one corner, that I'd lose 6 months of someone else's work, that I'd cause a "crash," crush a disk, or tie a tape in knots. I was not reassured by the old saw that the part of a computer most likely to cause trouble is the nut in front of the keyboard.

The computer that I learned on, a PDP-8, used a printout instead of a video display. Every so often my mistakes threw the thing into an endless loop; it would chatter on and on, regurgitating yards of paper and refusing to return control to me. The sound would bring in a member of the math department on the double. He would

glare at me, hit Ctrl-C, and stamp out.

The combination of anxiety and frustration is demoralizing. Recently I upgraded the memory on my PC by installing an expansion card. This procedure requires removing the microprocessor cover, iden-



Barbara Schoen

tifying the various innards, and resetting several minuscule switches. When I rebooted after the installation, instead of receiving the cheerful "Hello," the >A prompt, all my PC gave me was the low-level error message "10AA 201." The machine would not take instructions from me. I had a bad 30 minutes during which I retraced my steps. When I finally got it to respond with the familiar >A, I felt as though I was seeing a friend who had just recovered from an illness.

And it was like seeing a friend. Computers are usually so responsive and alive, and this, I have to admit, makes putting up with an out-of-sorts one all the more frustrating. I understand its beeps and clicks the way I understand my cat's trills and purrs. I am learning to use its secret language, hex. One of my favorite Sunday occupations is to explore a new piece of software with it.

But it is not alive. Indeed, it has some rather attractive artificial characteristics. It is always ready and patiently repeats the same dull task. And it won't tell anyone about my stupid mistakes (like putting 3 hours' work on a RAMdisk and then losing it by turning off the machine).

The computer is also unnaturally stubborn. If I don't work its way, it doesn't cooperate. It practices behavior mod on me. "Redo from start," it tells me. I have to alter my behavior because the computer can't alter its own.

The best thing the computer has taught me is to trust that, if I go back and retrace my steps carefully and follow instructions precisely, I will arrive at the desired result. This is the cure for computer anxiety. ■

Barbara Schoen is an associate professor at the State University of New York's College at Purchase, where she teaches writing. She also writes novels, short stories, articles, and poems.

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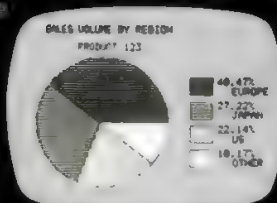
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Letters to PC

Computer Equality for All

Stephanie Stallings gives a heartening account of the role of women in the main-frame business environment in her article "Computer Equality for Women" (*PC*, Volume 3 Number 6). I have had a similar experience in my professional life (academic). However, she mentions a piece that I wrote for the *New York Times* concerning the biased treatment that I (middle-aged and female) received from salespersons in computer stores; that is, I am typed as belonging to a group that is supposedly not computer literate.

Mine is not the only group so typed. Recently I was in a computer store and fiddling with a PCjr when a black family came in, parents and three children. The father repeatedly tried to get the attention of the salesman. At length he did, and indicated that he was willing to pay for an expensive system. The mother asked intelligent questions about educational software. These interests were ignored by the salesman who insisted, "You want it for games, don't you?" The parents finally gathered up the children and left.

I have come to regard my own situation with a certain wry humor. However, the treatment of the black family evoked real anger. I walked out also.

Barbara Schoen
Bronxville, New York

PC-Rock Interface

This letter is in response to a letter in your April 3 issue from Ray Kelm entitled "That's How the Rock Crumbles," (*PC*, Volume 3 Number 6, page 84).

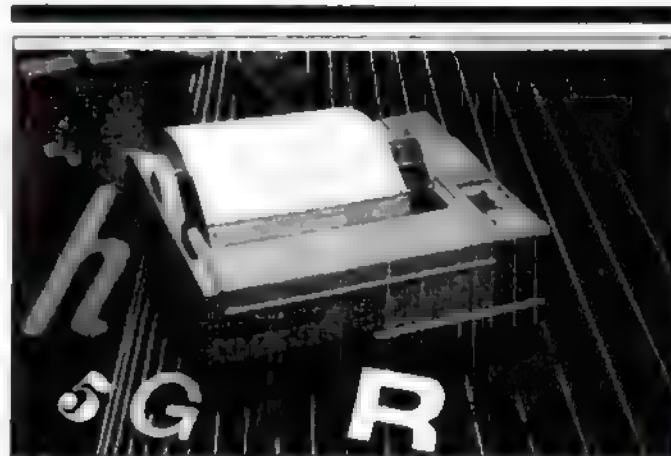
As a consulting firm, we have developed a specialized application for a client who has a sand and gravel operation based in Texas with multistate operations. An IBM PC-XT was interfaced directly to a truck scale, allowing the weight printed on

the scale ticket to come from the scale without having to be entered by the operator. The application system for billing, sales reporting, and accounting was written in *dBASE II*. Should Kelmer or other readers desire further information, they may contact me at Versatile Systems, Inc., P.O. Box 1076, Dallas, TX 75221 (214) 647-0030.

Michael D. Troxell
Dallas, Texas

A Quality Printer

I was pleased to see John Helliwell's informative and well-written article on the Texas Instrument 855 printer ("TI's Model 855: A New Definition for Letter Quality," *PC*, Volume 3 Number 6). I purchased an 855 in January and I generally agree with his assessment of its versatility.



I do feel that a few additional comments are in order.

The printhead does not require any special tools for replacement. It is attached with two easily accessible screws and can be installed and removed without taking anything else apart. According to TI, the cost of a printhead is \$125, not \$50, as stated in the article. The reason why I know all this is that I had to replace the printhead three days after receiving the printer. There was a manufacturing defect in the ribbon guide that caused the leading edge of single sheet paper (or the perforation on tractor-feed paper) to catch against

the platen side of the ribbon guide. While attempting to file down the projection, I damaged the printhead (sigh). Disappointingly, the replacement had the same defect, but a very careful application of sandpaper solved the problem (there are no TI dealers in this area, which is the only reason why I attempted to repair a new unit in the first place).

The font modules are what really sold me on the 855. However, I won't be fully satisfied until TI offers a wider variety. In order to take fullest advantage of the printer's quality print and flexibility, each font should be offered in monospace and proportional space versions, with the appropriate italic font to go with each. At present, there is only one proportional space module, so italics are out, especially if right-justified margins are required (a courier monospace module is the only italic module presently available). I've been waiting for a long time to banish underlining from my manuscripts once and for all; I guess I'll have to wait a little longer.

Helliwell is too lenient in his criticism of the difficulty involved in loading single sheets. The TI lacks even the sliding paper guide common to typewriters, making it tedious to get the paper in straight. The lack of a "top form" control makes it tiresome to manually adjust each sheet so that printing starts on the same line on every page. Furthermore, the paper bail does not lift automatically to clear the leading edge of the paper as it moves up from the printhead. The current arrangement discourages the use of single sheets, and this is a shame on a printer that produces print of high enough quality for correspondence and final drafts of manuscripts. I have none of these problems with my Daisywriter, and as a result it gets to do some of the work that would otherwise have been delegated to the 855. I agree with Helli-

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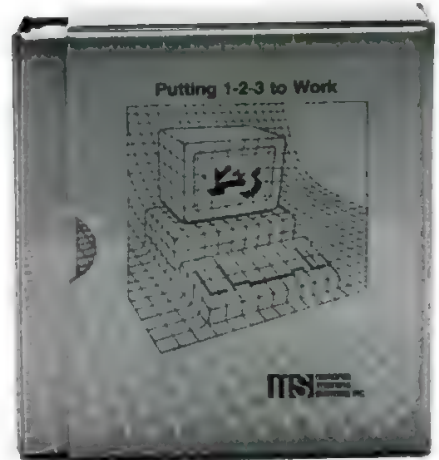
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well that the quality of print need not be defined by what typewriters can do, but neither should the method of loading paper.

Finally, I want to point out that I was not able to get the 855 to work with the Diablo 630 table of my *Volkswriter Deluxe*. It does work perfectly with the Epson MX table.

In spite of these criticisms, I find the printer to be an excellent value and I would not hesitate to recommend it to anyone looking for a dot matrix printer that can handle nearly every printing chore with excellent results. I plan to keep mine a long time.

Stephen Saraydar
Ithaca, New York

Correcting a Heartbeat

In my article, "The First Heartbeat," (*PC*, Volume 3 Number 6) there is an error in Figure 2 (page 205) that may or may not render BIGMEN.COM unusable, depending upon the contents of memory at DS:101 when DEBUG is invoked.

The figure can be made workable either by changing the first line to:

-E 100 1E 90

or by subtracting 1 from every address after the first one (in other words, line 2 becomes

-E 101 33 C0

and so on).

The second method produces the equivalent of Figure 1 (page 204), while the first compensates for the error by adding an NOP instruction after the PUSH DS.

David McManigal
Stromville, New York

Not Too Tough

The article on RGB monitors ("Taking a Closer Look at the RGB Monitor," *PC*, Volume 3 Number 6) twice gave 600 times 400 as the normal pixel resolution, when it's really 640 times 200. For exam-

ple, my QuadChrome is 690 times 240.

Also, the article "Avoiding Dead-End Paths on the Hard Disk" (*PC*, Volume 2 Number 7) contained an error. After entering CD /SD, the commands CD /DS/ CALC and CD /CALC are not equivalent. Dan D. Gutierrez's letter concerning this

The fat and often
inscrutable DOS
manual is not what
anyone would call
fun reading.

error was also incorrect ("Dead End," Letters to PC, *PC*, Volume 3 Number 6, page 77). The backslash at the start of the path indicates that the path starts at the ROOT directory. To start with the CURRENT directory, the backslash is omitted. Thus, the correct equivalent commands are CD /SD/CALC and CD CALC.

Come on . . . this stuff isn't that tough.

Patrick Banchy
New York, New York

True, it's easy once it's been explained. But come on, Pat, even you would admit that the fat and often inscrutable DOS manual is not what anyone would call fun reading. And there's so much in it, especially for beginners, that it's easy to get information overload while slogging through it.—Ed.

Printer Connection

I read Don Holzman's review of the CMC5060 electronic typewriter interface ("The Selectric Connection," *PC*, Volume 3 Number 3). Since my company, Wordlink Systems, Inc., also manufactures an interface for the IBM electronic typewriters, I believe he could have been more objective. He states: "You can't change type pitch through software." Surely he is aware that you don't send a new pitch selection to a letter quality printer without also stopping the printer to



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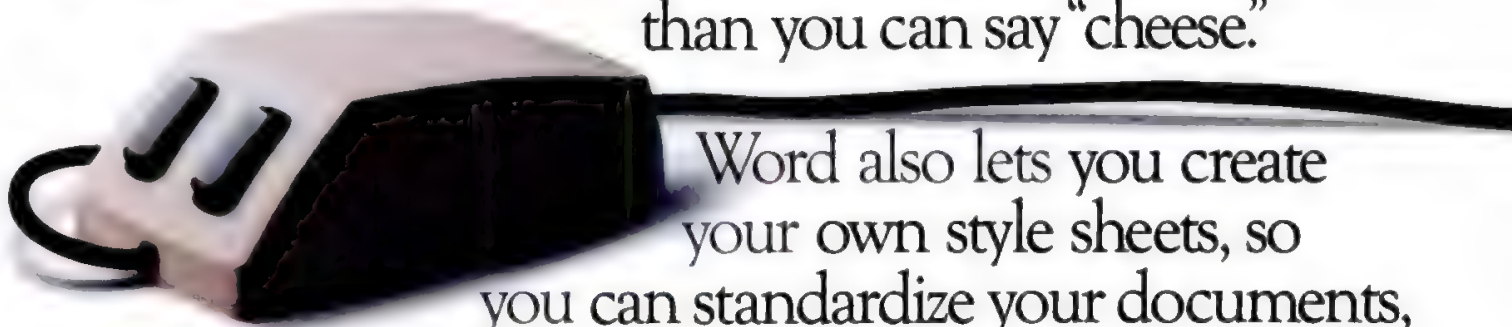
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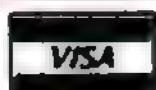
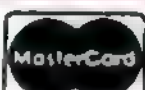
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change the print element. Moving the pitch selection lever is a minor extra task.

Later in the article Holzman writes: "The conversion table is not accurate for all type balls." This is a common problem with most type ball or daisy wheel (fixed font) printers. It is not a problem unique to the typewriter. Some typists and word processing operators use key overlays when special fonts are used regularly.

Holzman writes that the IBM Selectric typewriters are "... slow compared to most letter-quality printers." Sixteen characters per second is as fast as most of the lower-cost letter-quality printers, and produces superior print quality. And 16 characters per second is three to four times faster than a competent typist! This is sufficient for many office applications either for primary or backup use.

If you already own one of the IBM electronic typewriters you can use it for letter quality printing for little extra money. Contrary to what Holzman says, this is a practical alternative for many printing requirements.

Ron Tubman

Etobicoke, Ontario, Canada

Don Holzman replies:

I offer the following comments to the items mentioned in Tubman's letter: When Tubman states: "You don't send a new pitch selection to a letter quality printer without also stopping the printer to change the print element," he is referring exclusively to certain daisy wheel or typeball models of letter quality printers. If you own a dot matrix letter quality printer, you can change any print parameter under software control without stopping the printer. Some of the more expensive daisy wheel models have enough characters available on the element so that font or pitch change can often be accomplished under software control.

In addition to impact dot matrix letter quality printers, letter quality ink jet printers can, in principle, change type pitch, font, alphabet or any other printing parameter in the middle of a job under

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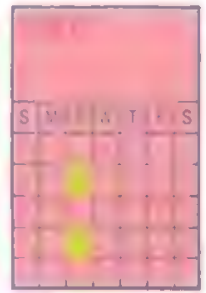
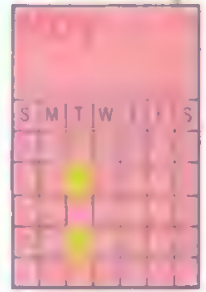
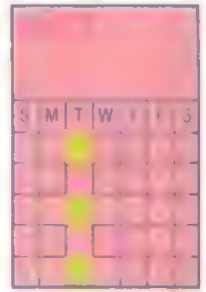
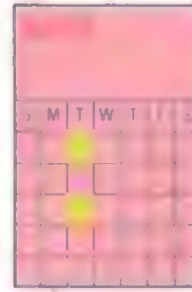
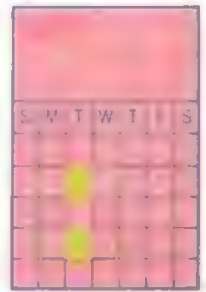
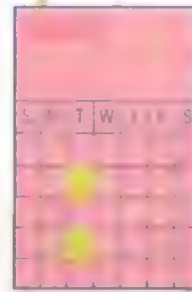
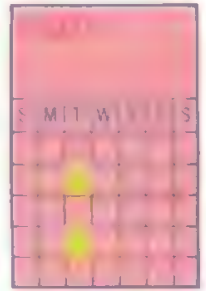
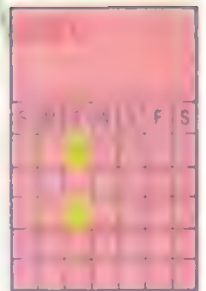
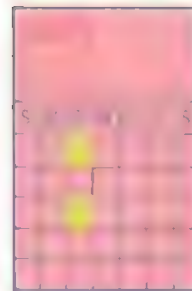
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BULL????

A lot of it is being slung around! Clearly, you need a lot more than just an index finger and an elbow to meaningfully use a computer. Is having a cluttered screen of options and windows easier? After the first blush of novelty and gimmickry and puffery wears off, will it really be easier and better? One thing is for sure — it is going to take time to shake these new systems out and make them functional in user environments.

For those who want to have an easy to use, integrated, efficient computer operation now, **SysteMate is the answer!** SysteMate is an user friendly menu driven interface between PC-DOS and applications. When you complete your work with Lotus, Symphony, dBase II, WordStar, or whatever, you exit back to a SysteMate menu instead of DOS. SysteMate is so simple that usage is actually self evident!

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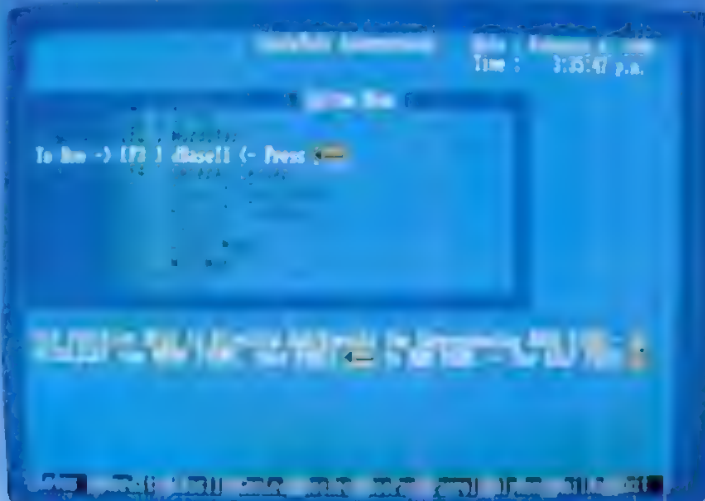
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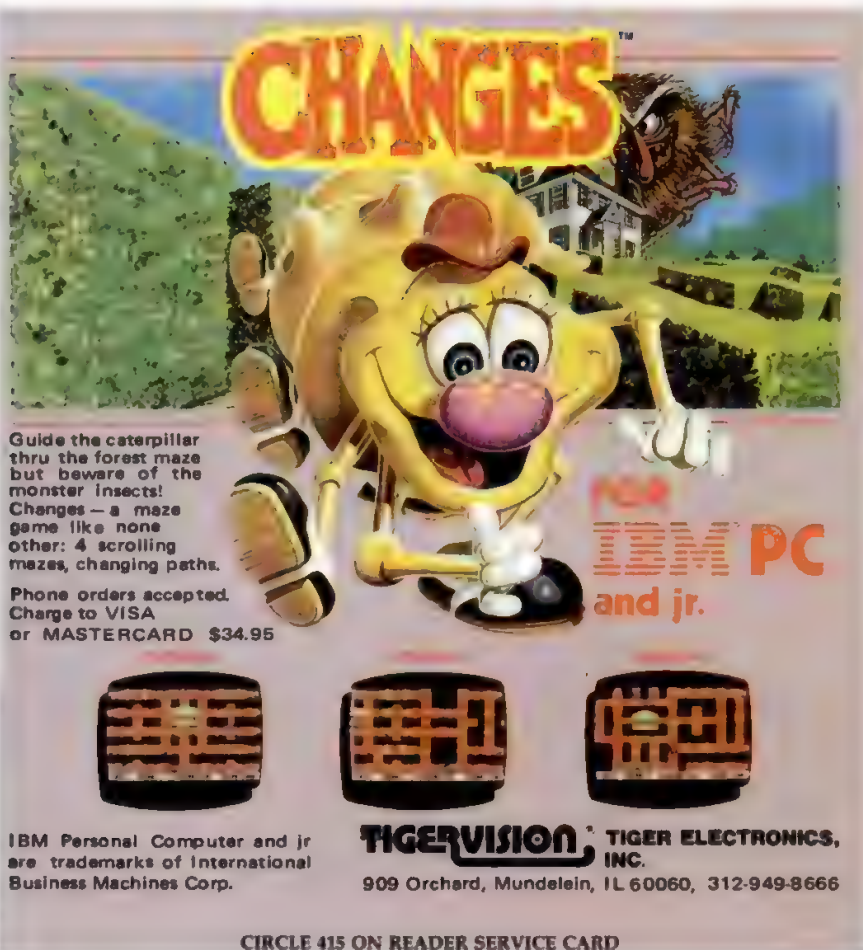
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LETTERS TO PC

software control. The same software control is possible using letter quality laser printers, which are just now becoming available for personal computer users.

If a user is printing documents which require frequent change in font or pitch, such as a document with a lot of italics or condensed print, it is a tremendous nuisance and waste of time to have to stop the printer to change elements each time a new font is required. Doing this a few times will probably convince even the most diehard daisy wheel printer fan that one of the other types of printers is more suitable.

I certainly did not mean to imply that the conversion table problem was unique to typewriters. It would be nice if the documentation indicated which typeballs the conversion chart applied to and provided alternative conversion charts for other balls.

In regard to Tubman's last comment, that the new wave of lower-cost letter quality printers attain speeds of only 16 cps is irrelevant. An IBM electronic typewriter costs several thousand dollars. For the same price, you can buy two high quality dot matrix letter quality printers which will print at least five times as fast. I do agree that the print quality is much better with an IBM Selectric than a low-cost letter quality printer; I stated that this is the main reason for making the connection in the first place.

My article was aimed at people who may already have an electronic typewriter. If 16 cps is sufficient for their office use, fine. In our office, we have found that our Model 50 Selectric is too slow for routine use, so we use it only when we need top quality printing.

Participate in a Study

I am a student at the University of Chicago's Graduate School of Business and specialize in management science information systems. I am currently conducting an honors project on the interaction between microcomputer users and word processing programs.

I have been able to conduct a small preliminary survey of Chicago area businesses on their employees' uses and preferences for word processing programs for

With a dot matrix printer, you can change any print parameter under software control.

both micro and mainframe text editors. This preliminary study revealed a correlation between an employee's profession and choice of word processor.

I would like to refine my data and expand my sample size with a revised survey. This new study should provide me with the necessary data to complete my project.

If any readers would like to express their interests and preferences in word processing programs and be part of this study, please send a stamped, self-addressed envelope to me at Box 255, Bensenville, IL 60106.

Aarne Elias
Chicago, Illinois

Fly with an Eagle

After reading "Playing Hardball Against The XT," (PC, Volume 3 Number 6) I decided to share some insights with Winn L. Rosch on the operation of the Eagle 1600.

His major complaint seemed to be booting off the fixed disk rather than the floppy. To accomplish a floppy boot, all you need to do is push the F key before booting. The floppy starts spinning and off you go. Pushing T before booting will run an internal hardware test.

On the IBM keyboard you often need three hands to reach all the buttons needed for some functions. With the 1600's 24 function keys, one finger will do the job. Print screen is a shifted asterisk (*) on the numeric keypad.

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LETTERS TO PC

If it's speed you want to see, place an Eagle beside a PC, boot up the same program in both and the Eagle will run three to five times before the IBM runs once. Although the BASIC compiler he used in this test was apparently not compatible, I am currently running over 100 IBM format programs on my 1640 including a COBOL compiler. In 2 years, three IBM programs I have tried refused to run.

DOS 2.0 has always run on the 1620 (with two floppies). Eagle has just released the system for the 1630 and 1640 (fixed disk systems). *Spellbinder* is the word processor that is included with Eagle computers, along with the *Ultracalc* spreadsheet.

The Eagle will also format a diskette in IBM single or double side form by typing `FORMAT/IS C:` or `FORMAT/ID C:`. The only complaint I have about the Eagle is the documentation: I had to learn all this on my own.

Russell Trundle
Victoria, Texas

Problems with Compatibles

I read your IBM PC compatible issue (*PC*, Volume 3 Number 6) with considerable interest. I own a Columbia MPC 1600-1 (my first computer). I feel your coverage was excellent, but there are some things that need to be addressed to make the story complete. Why do people buy IBM PC compatible computers? What do they get for their money? What are their expectations and experiences? In talking to other compatible owners, I find my objections and experiences rather typical.

My reasons for buying the Columbia instead of the IBM were quite simple. The price difference was a few dollars, and the MPC comes with a large bundle of software. My goal was to get into database, word processing, and eventually spreadsheet-based graphics at a definable cost. I figured as a first-time computer user having a single software/hardware source to deal with would get me up and running fast. Having bundled software also spares

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LETTERS TO PC

the novice the burden of having to select software, right? Columbia centers its bundle software offering around Perfect Software products. The software bundle was a nightmare. By the admission of both Columbia and Perfect, the software was buggy.

In my opinion, buying the MPC on the basis of bundled software was an error. I'm not sure what the bundle builds into the cost, but if I could return it for 50 cents on the dollar I'd do so with pleasure and speed.

The MPC is said to be hardware compatible. So far mine is, but in order to be so I have had to go to some lengths. Try and buy a third party RAM board. I have now created a database of manufacturers and products that claim Columbia compatibility. I look at ads for PC peripheral products and truly envy PC owners for not having to ask "Will it. . . ?".

And finally the big one. All compatible owners live with this fact: By the grace of IBM, we compute. Someday, IBM may shut off our water with a proprietary operating system. Our supply of state-of-the-art software will either end or we will bear considerable expense to stay current. This will probably happen about the time when IBM's production capacity meets product demand level.

Did I meet my objectives by getting up and running fast and saving a few dollars? Hardly. I now know that I didn't ask the right questions. Yes, the Columbia is as compatible as any compatible that can be bought. In fact, I'm running IBM PC-DOS 2.0 right now. (Columbia MS-DOS 2.0 has been on backorder for months.) *Flight Simulator* runs perfectly and I run several IBM published packages without fault. This computer thinks it is an IBM PC. But for how long and for what price? The few hundred dollars saved could be wiped out by one noncompatible, nonreturnable purchase.

Since my personal experience and viewpoint is all that I can fairly offer, my comments concern the Columbia MPC 1600-1. I would like to stress that as a

compatible the Columbia is top of the line. The hardware has operated flawlessly and met every claim made by its manufacturer. We can presume that those who have

bought less compatible computers could by contrast make my experiences seem insignificant. My only point is that compatible buyers assume certain risks and

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LETTERS TO PC

costs that IBM buyers do not, and they should be aware of these issues as they weigh their decision.

J. Johnson
Minneapolis, Minnesota

Photo Change

I erred while numbering two of the photos accompanying my review of NAPLPS graphic products ("The Shape (and Color) of Things to Come," *PC*, Volume 3 Number 8). Photos 2 and 4 on page 193 should be transposed. In fact, photo 4 shows the high-quality color output from the Plantronics COLORPLUS board, and photo 2 demonstrates the fuzzy, illegible text produced by the composite video output of the IBM color/graphics adapter.

David McCune
Brooklyn, New York



Correction

There was an error in the last sentence of Mead S. Moores's letter in "Letters to PC" (*PC*, Volume 3 Number 10, page 92). It should have read: "Personally, I liked Zachmann's reply, which indicated an in-depth investigation of the question, as opposed to Koessel's reply (in *PC World*), which was 'off the top of my head without testing it.'" Our apologies to Mark Zachmann and Mead S. Moore for this error.

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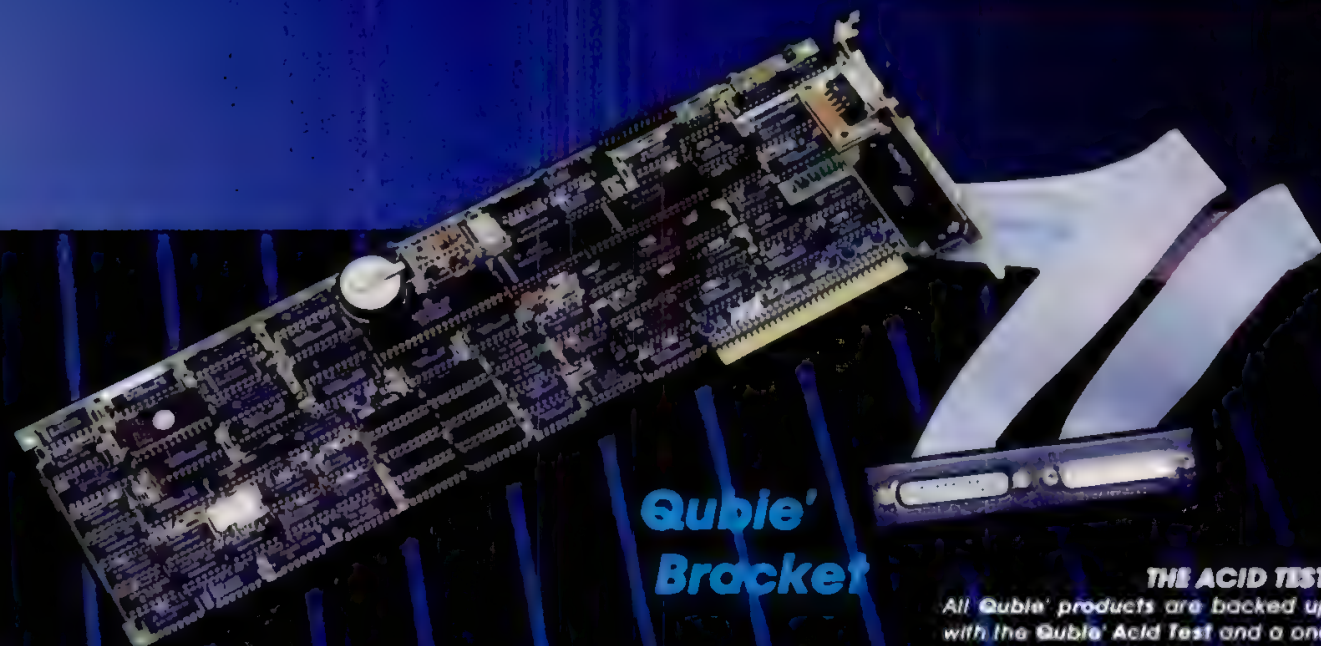
emulation and printer buffering. This software was picked by the readers of PC WORLD magazine as the overwhelming favorite in their Readers Choice poll. Optional is an IBM compatible game port. We even throw in our Qable™ cable bracket to mount the ribbon cables without occupying expansion slots. SixPakPlus includes: serial port, printer port, user replaceable battery powered clock/calendar, AST SuperPak software, Qable™ cable bracket, and sockets for up to 384K of memory, \$229. Options: Each 64K of memory \$55, Game port \$20.

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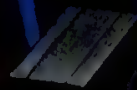
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The Kitchen Table Software Handbook

If you've dreamed of creating and marketing your own software, it's time to wake up and explore the possibilities of do-it-yourself publishing. A cost analysis is a good place to begin.

Do you want to be a software entrepreneur? Do you want to try your hand at establishing a kitchen table software house? This is a dream of many personal computer enthusiasts.

As most PC readers know, I've played the one-man software house game. I've been there; I've made the mistakes; I've had some success. If you're dreaming of setting up shop, my insights might be helpful.

We'll begin with some of the practical details of running your own software business: manufacturing and selling. Let's consider what it costs to manufacture software. The kind of product you develop and how you choose to package that product, has a radical effect on the cost of production. Other important factors are volume and volunteer versus paid labor. All of these can vary costs tremendously.

Here's a typical example. Most kitchen-table software developers will choose to write a modest program—one that would fit onto a single diskette and that wouldn't need more than a small booklet for documentation. We'll take that sort of product to work out some typical costs.

Quite a few items go into producing a software package: the diskette itself, the labels, and the envelope or sleeve to cover it. Other elements include printed documentation, reference or registration cards, the packaging (such as the vinyl folders in

which PC software is often sold) and possibly color-printed wrap-around or shrink-wrap.

Acceptable quality single-sided diskettes cost \$1.30 to \$1.70 each. The ads in



Peter Norton

the back of PC and other computer magazines are a good place to shop for volume diskette suppliers. You'll find that prices are much lower than what you'd pay at retail computer stores—after all, we're talking wholesale here.

I have tried several brands of diskettes; all proved reputable, though I've had good and bad experiences with each. I settled on a supplier that was located nearby and gave quick service. Provided you're using ordinary diskettes in modest volumes, you

don't need to scout around for special sources.

Flippie Floppies

However, I use flippies, or reversible diskettes that act as two single-sided diskettes. They cost \$2.18 each, or \$1.09 per side. Flippies are an appropriate choice if you can't fit your program onto one diskette side (and if you want to stick to the universal single-sided format). Flippies are higher-quality diskettes than bottom-priced single-sided ones, and I save 20 to 40 cents per side. As an added bonus, I save the weight and bulk of another diskette. If flippies suit your product, they are a real boon. But let's assume that the price of the diskette is \$1.30.

To label your diskettes, you could have custom die-cut labels made. If you don't want to get fancy, you can buy standard ones at a paper supply house or stationery store. I use Avery labels number 5523, which cost me about 1 cent each. You can have them printed at a neighborhood quick printing chain for a cost of about 1 cent for each color printed. Let's price labels at 3 cents each.

Envelopes may come free with the diskettes, though bulk-price diskettes without envelopes are often cheaper. If you want customized printed envelopes, a supplier can make them up for you, but I have found ready-made ones satisfactory.

A personal library for your



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Best Sellers

Inside the IBM PC: Access to Advanced Features and Programming by Peter Norton



The most widely-read author on the IBM PC gives the reader a look inside the workings of the computer and the advanced features it can provide. This best seller includes the fundamentals of the microprocessor, the operating system and PC DOS. In a very readable book, Peter Norton takes you beyond the machine, interprets its languages for you and introduces you to ROM.

1983/320pp/paper/ISBN 0-89303-556-4/\$19.95
Book/Diskette Package ISBN 0-89303-561-0/\$79.95

IBM PC: An Introduction to the Operating System, BASIC Programming and Applications, Revised and Enlarged by Larry Joel Goldstein and Martin Goldstein

An updated and expanded version of what has become the classic self-study book for the IBM PC. New chapters on BASIC emphasize the importance of structuring and planning programs and important new information on debugging. Games and graphics are included and the section on random access has been expanded. Includes DOS 2.0.

1983/448pp/paper/ISBN 0-89303-530-0/\$17.95
Book/Diskette Package ISBN 0-89303-527-0/\$39.95



IBM PC/XT Assembly Language: A Guide for Programmers by Leo J. Scanlon



An introduction to the fundamental principles of microprocessors (specifically the 8088), numbering systems, and assemblers. The book first outlines the steps necessary to create and run assembly programs and then describes the entire instruction set of the 8088 microprocessor.

1983/384pp/paper/ISBN 0-89303-241-7/\$19.95
Book/Diskette Package ISBN 0-89303-535-1/\$49.95

Personal Computer

MS DOS and PC DOS: User's Guide by Peter Norton



The authority, Peter Norton, gives an introduction and explanation of the Microsoft Disk Operating System precisely right for the beginner. It provides

examples and instructions not available in any other book. Just off the presses, MS DOS and PC DOS will be the next Norton best-seller.

1983/250pp/paper/ISBN 0-89303-645-5/\$15.95

Firsts

8087 Applications and Programming for the IBM PC and Other PCs by Richard Startz

New on the shelves and on the minds of 8087 microprocessor users, the pages begin with a non-technical introduction and turn into very detailed technical



descriptions of the potential application. It includes sections on Advance Instruction Set, Non-linear methods, Statistical Analysis and Program Canning.

1983/250pp/paper/ISBN 0-89303-420-7/\$19.95

Communications and Networking for the IBM PC by Larry E. Jordan and Bruce W. Churchill



This book brings together data communications applications and the IBM PC. It includes asynchronous and synchronous communications and a complete

study of local area networking. A full chapter on communication codes and controls is included to demystify the language.

1983/225pp/paper/ISBN 0-89303-385-5/\$16.95

It's Basic

Handbook of BASIC for the IBM PC by David Schneider

This book for the layman presupposes no knowledge of BASIC and clearly translates the BASIC reference manual supplied with the IBM PC into completely comprehensible terms. Organized by BASIC programming statements, it allows the user to go directly to the desired information without confusion or delay.

1983/350pp/paper/ISBN 0-89303-506-8/\$19.95



IBM PC/XT Owner's Manual: A Practical Guide to Operations by Barbara Lee Chertok, Dov Rosenfeld, and James Stone



This entry level book provides easy instructions on the operations of the IBM PC. After reading this new guide with clear, concise examples, the PC user is

up and running on the machine in a minimum amount of time — without programming classes.

1983/128pp/ISBN 0-89303-531-9/\$12.95

Advanced BASIC and Beyond for the IBM PC by Larry Joel Goldstein

A complete guide to the advanced skills of BASIC programming, files, graphics, event-trapping, machine language and subrouting. A must for the IBM PC programmer.

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Book/Diskette Package ISBN 0-89303-325-1/\$39.95



Business

Business Problem Solving with the IBM PC & XT by Leon Wortman



Business professionals will make use of the dozens of computer programs specifically designed for decision making and problem solving. Source codes are included in BASIC,

with many also in Pascal.

1983/350pp/paper/ISBN 0-89303-282-4/\$19.95

Business Applications for the IBM PC by Steven Zimmerman and Leo Conrad

First time users will find this guide to the IBM PC ideal. It offers step-by-step instructions on the use and customization of existing business software programs.

1983/350pp/paper/ISBN 0-89303-243-3/\$17.95



Personal Interests

Games, Graphics, and Sound for the IBM PC by Dorothy Strickland, Dennis Rockwell, and Kevin Bowyer



This guide teaches how to program in BASIC, Pascal and FORTRAN to create graphics and sound for the IBM PC. It illustrates in 70 working examples how to

integrate sound and graphics into animation. And, it includes an example of how to create a simple video game.

1983/288pp/paper/ISBN 0-89303-469-X/\$18.95
Book/Diskette Package ISBN 0-89303-470-3/\$64.95

BASIC Engineering and Scientific Programs for the IBM PC by Philip Wolfe and C. Patrick Koelling

A source of BASIC programs written exclusively for on-the-job use by engineers and scientists to provide important computer techniques for problem solving and data manipulation.

1983/320pp/paper/ISBN 0-89303-330-8/\$19.95
Book/Diskette Package ISBN 0-89303-331-6/\$39.95



Pascal for the IBM PC: IBM DOS Pascal and UCSD p-System Pascal by Kevin Bowyer and Sherryl Tombouljian



This is the first written word on combining the IBM PC and Pascal Programming. Soon it will be the last word for anyone who wants to break the limits of BASIC programming.

An emphasis on graphics and sound applications.

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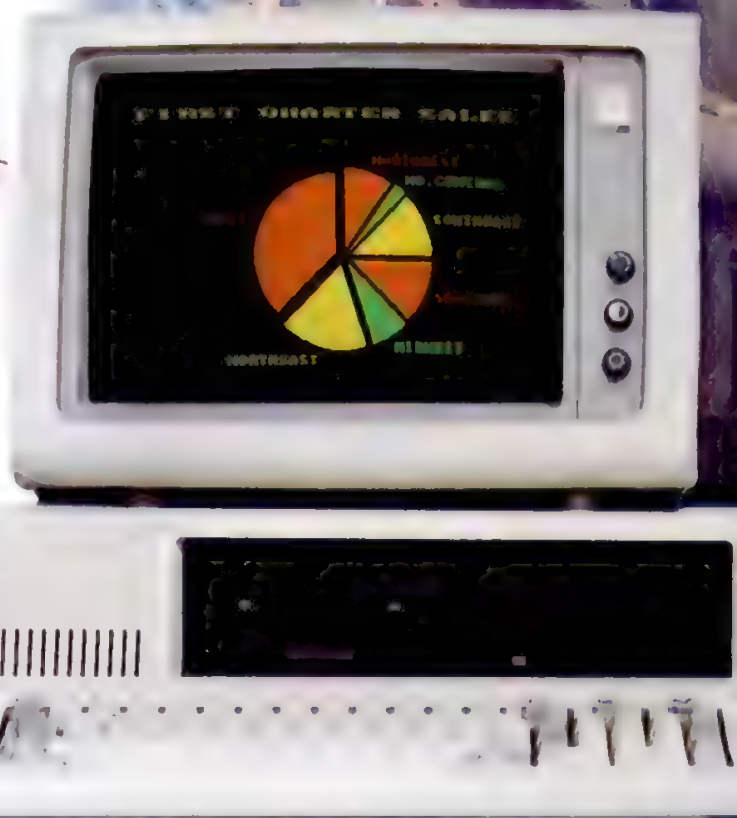
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The Copy Caper

Copying the diskettes is another element. You may do it yourself at no cost. When you're starting out, in low volume, that can be reasonable. I did it for quite a while with the DISKCOPY command, which takes nearly a full minute per diskette side. Later I used a custom-written copy program that would continuously format and copy diskettes in 30 seconds flat, cutting the time in half and the nuisance by even more. Anyone who wants a copy of that program can have one by sending me a diskette, a return mailer, and a buck for the trouble, care of *PC Magazine*.

Another option is to employ a diskette copying service. Usually these services provide their own diskettes and give you a bundled price for the diskette and the copying; many will also copy onto your own diskettes for a copying charge only. Copying runs about 30 to 50 cents per diskette. That may seem steep, but it can save you time and trouble and give you a technically much higher-quality copy. (See the March 1984 issue of *PC Tech Journal*, Volume 1, Number 6 for a valuable review of copying service entitled "Disk Duplications.")

In my own case, I thought that my volume would justify getting my own copying machine. I bought an MST model 5248 for a cool \$16,000 (gasp). I'm told that Peachtree, IBM, and other software giants have battalions of these 5248's working round the clock. A pricey gamble, but if it works out as planned it will bring my copying cost down to about 5 or 10 cents a diskette, a substantial saving.

For the cost estimate we're building, let's take a range of zero (do-it-yourself) to 40 cents per copy.

Docu-Drama

Next let's consider the documentation. The price varies greatly by the size, number of copies, and number of colors print-

ed. Games usually do nicely with just a few pages of documentation. My Norton Utilities come with a 56-page booklet. *ProKey* takes the size of a pamphlet to the limit: 128 pages. You might expect a range of costs from 20 cents to a dollar each, and that's what we'll work with

To complete your packaging, you may want an eye-catching four-color paper cover on one side of the package, similar to the wrapper IBM uses on its games.

here. You should be able to find local printers that can handle the full job for you—printing, collating, and stapling. Many printers also can arrange typography and layout work for you, or you can use a graphics arts service to produce the "camera-ready" art that a printer needs. Many services are prepared to set type from files on a PC diskette, which can save you the cost of having a typesetter keyboard your documentation and also avoid the typos that usually come with rekeying. The outfit that I use has done good work for me and is now setting up a special service dedicated to sorts of work that software producers need: Interface Typesetting Media in San Jose, CA (408-947-8324).

Packaging is the next big item. Thanks to IBM's lead, two kinds of program packaging have become standards for the PC. One is the slip-case three-ring binder such as ones that encase the DOS and BASIC manuals; the other is a small vinyl folder that holds a diskette and a pamphlet. (A third IBM standard, plastic boxes, started appearing with the PCjr.)

We're not really discussing big-league programs here, so the vinyl folder is the sort that we're likely to want. These folders have to be custom-made to your specifications, and most large cities have several companies that specialize in this sort of work. Prices seem to range from 80 cents to \$1.20 each. We'll take a dollar as a typical price.

To complete your packaging, you may want an eye-catching four-color paper cover on one side of the package, similar to the wrapper IBM uses on many of the games it publishes. I'll guess that this small extravagance (which, by the way, makes good marketing sense) will cost 10 cents each. If you shrink-wrap your package in clear plastic, add another 10 or 20 cents. (I don't, because I want potential buyers to be able to browse through my documentation booklet.)

The Grand Total

The total production cost of a small software package is about \$3.85 per copy.

- \$1.30 Diskette
- .30 Copying
- .15 Envelopes
- .10 Labels, cards
- .50 Documentation
- 1.00 Vinyl folder
- .25 Color card, shrink wrap
- .25 Your labor

The figures I used to produce this total are based on a reasonably high volume of program sets. While that's something we should hope for, it isn't what we're likely to have at first. We might multiply this total figure by an arbitrary 1½ fudge factor to get an idea of what a low-volume cost would be a little more than \$5 a copy. From my own experience, I think that's a reasonable figure for you to work with. This cost estimate doesn't include any overhead costs such as rent for a place to store materials and supplies. It's just a raw production cost.

Now that we've seen what it might cost you to make a software package, we'll take a look next at what you can expect to charge for your software. ■

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TY? WHO'S NICE? NO PROBLEM!"

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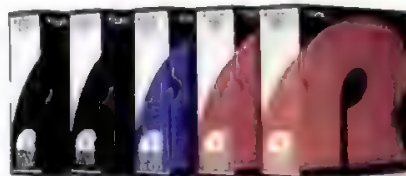
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COVER
STORY

P R O J E C T:

DATA BASE



In this issue, PC conducts an investigation of the database programs crowding computer store shelves and competing for your attention and dollars.

WE HAD TO DO IT. Nearly every week another database management program appears on the market, promising to make your work easier, do away with programmers, allow you to call up data instantly—in short, promising to surpass every current and future microcomputer database. At last count, there were 66 of them!

How could anyone begin to choose? How could a retail store stock 66 different database packages? How could we at *PC Magazine* advise our readers? The packages kept appearing, almost out of thin air. When Ashton-Tate announced *Friday!*, a second database package written in Ashton-Tate's existing database software, *dBASE II*, we knew things had gone too far. The challenge was on.

We began tracking down every software product described as a database. We made innumerable phone calls and ran up an outrageous phone bill.

The Breakdown

The packages poured in. Our next step was to divide them into four major categories according to general type. Simple file handlers that operate on whole records rather than on fields and that manipulate one file at a time fall into Category 1. They are essentially electronic file cabinets or Rolodexes and are best suited to the tasks of adding, deleting, and retrieving records or file folders of information. They are most commonly used for maintaining address lists.

To be a candidate for Category 2, a database must have a genuine database structure such as relational (which was by far the most common), network, or hierarchical (see glossary for definitions of these terms), and had to use this structure to manipulate at least two files at a time. In addition, Category 2 databases had to include a query language, which is a way of obtaining information about the contents of a database. A sophisticated query

language enables you to manipulate the database with the Boolean operators "and" and "or" and with the logic phrases "if," "then," and "else." Queries might be entered as commands, selected from a menu, or described in a report generation function. A query language may or may not be interactive.

Category 3 databases must have a procedural language in addition to all the capabilities required of Categories 1 and 2. A procedural language outdoes its simpler cousin the query language by including loops and GOTO commands. It can always be used interactively; in theory, at least, the user would never have to know anything about the database package or the procedural language. In a procedural language, groups of commands can always be stored for later use. A procedural language is a programming language specialized for a particular software package.

A good way to determine whether or not a language is procedural is to see if it can handle a multistep, interactive task such as checkbook maintenance. Maintaining a checkbook requires totaling checks, marking off paid ones, and balancing. You would prepare a procedure to perform each of the subtasks and then link them together with a fourth procedure that would interact with the person at the keyboard. With this arrangement you could make changes to the check register based on date or dollar criteria and select subtasks repeatedly without ever leaving the main procedure.

To meet the criteria for Category 4, a database must have everything a Category 3 package has and more. It must be out-

standing in some way. For instance, it might have automatic pathfinding, which is the capacity to draw data from other files once the relationship has been specified. Or it might use a special technique for storing fields so that you never have to specify field lengths and types. Category 4 would be the place for that ideal database that in some way sets a new standard in microcomputer database design.

Search for Perfection

Have we discovered the perfect database package? We have left that up to our reviewers to determine. In early March, we gathered 18 database experts at the PC offices for an all-day planning session. We gave our reviewers a chart to complete for each database to ensure that the same questions would be asked about each package and to provide a direct comparison among them. As you'll see when you look at the chart, we came up with quite a few questions. We also gave each reviewer specific tasks to carry out, accompanied by the necessary raw data. These tasks, which differed for each category, enabled us to determine the flexibility and power of each product. For each database, the authors wrote short articles describing the strengths, weaknesses, and angst involved in analyzing this specialized software.

At last count, there were 66 database packages available for the IBM PC: 34 in Category 1, 9 in Category 2, 17 in Category 3, and 6 in Category 4. We've split the coverage over six issues, working our way up from the simple file handlers to the cream of the crop. In this issue we present eleven databases from Category 1.

We've already resigned ourselves to the probability that by the time we reach the sixth issue several more companies will have decided that their database design is the answer to your needs. Many more databases will appear out there. They'll demand that you consider and buy and demand that we categorize and analyze.

We had to do it.
—Stephanie Stallings

Putting the Databases to the Test

Our reviewers followed specific testing procedures for each program.

GROUP 1	
EMPLOYEE RECORD	
First name	
Last name	
Address	
City	
State	
Zip	
Employee number	
Dept. name	
Salary	

Group 1 consists of 1 record per employee.

The testing procedures we used in the database survey were designed to ascertain the upper limits of each package's capabilities.

The test specifications for each category were accompanied by files of data consisting of approximately 500 records each. Some of the databases do not allow importing of data from outside files, especially in Category 1; in these cases we gave the reviewers small, 25-record files to enter manually. All of the files were originally provided in 2 formats: SDF or standard data format and (fixed length) ASCII sequential. Several of the reviewers found that their databases would only import DIF (data interchange format) files, so we provided the data in that format, too.

The tasks for all groups centered on a personnel system. In Category 1, the tasks used a single employee file containing name and address information, employee number, department name, and salary. We asked the reviewers to store or index the employee records by last name and then to do an ad hoc query to view the records on the screen, extrac-

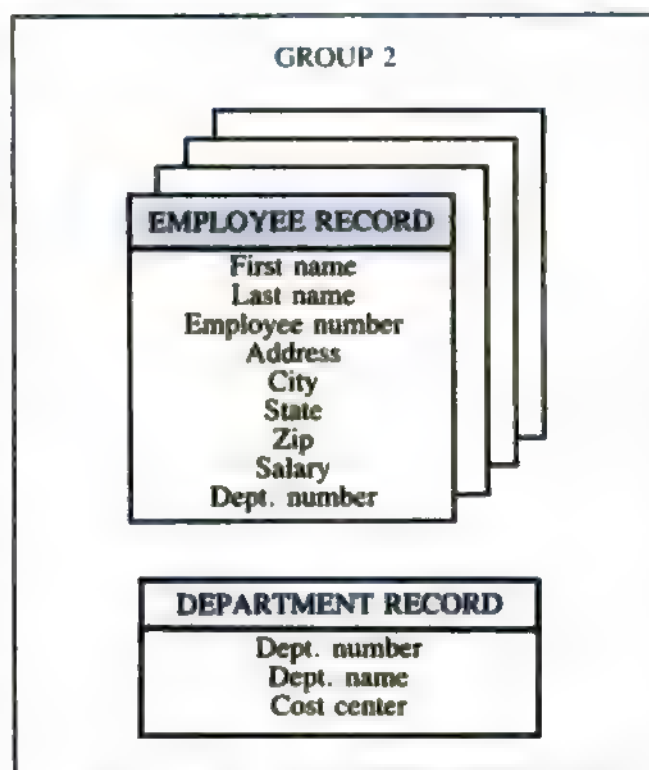
We began tracking down every software product that described itself as a database.

ting the employees by last name, employee number, and department name. The final step was a two-level sort by salary within department, reporting all fields to the screen. If the database was incapable of this, the task was to be done on salary only.

The tasks for Category 2 were the same as those for Category 1, but since a requirement for the second category was the ability to handle two files simultaneously, we split the data between two files. The employee file held the same data as previously, except that it now contained the department number, not the department name. A second file included department number, the department name, and the cost center number. To display the department name in the query and in the report, the reviewers had to use the department number from the employee record to search the department file for the matching number and then to retrieve the related name.

The tasks and the files for Category 3, those databases with a procedural language, and Category 4, those with special searching and computation capabilities, were somewhat different from those used in the other groups. To put these more complex databases to an adequate test, we used three files. The employee file included name, address, and employee number and could be called the master file. In Category 2, departments were keyed by department number. In 3 and 4, however, the key for the department file and the salary file was no longer the department number but the employee number. All three files were thus related by employee number. The department and salary records could be described as detail records of an employee master record.

The department file for Categories 3 and 4 was made up of employee number, the date on which the employee started in the department, department number, department name, and cost center number.



In group 2, the department record is accessed from the employee record.

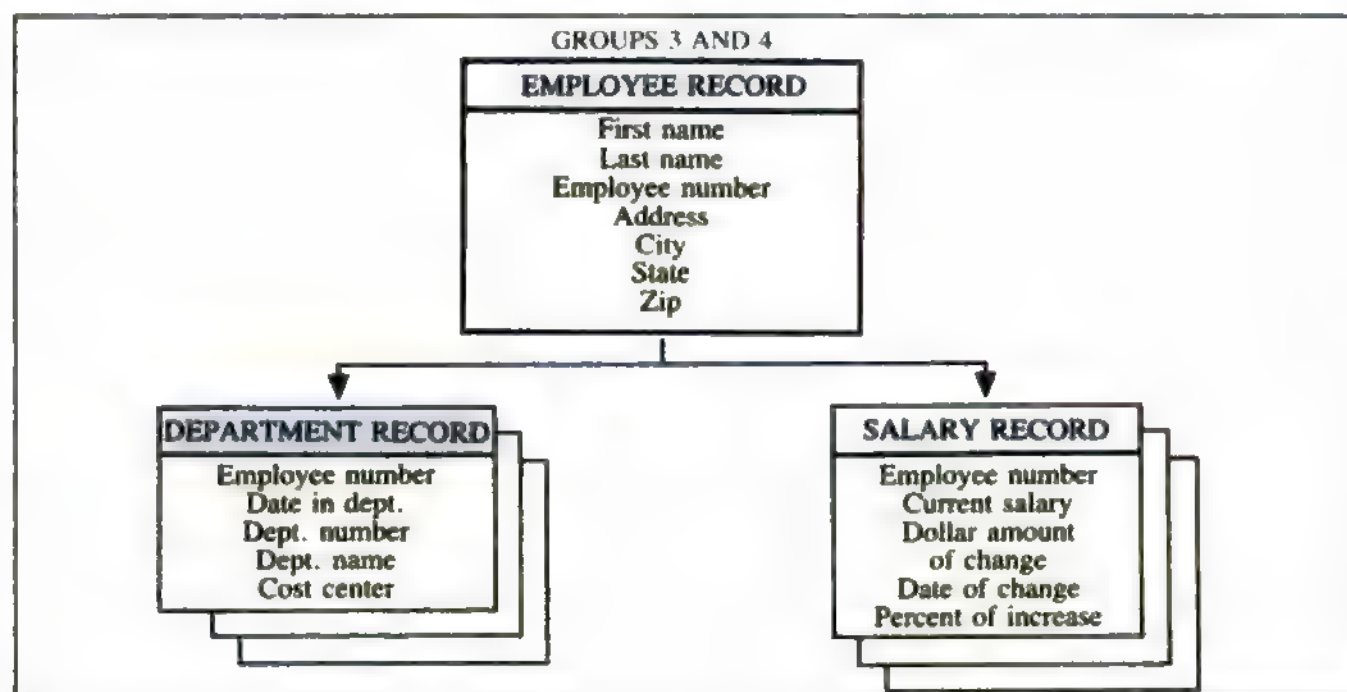
Since it was possible to change departments, several employees were given more than one department record, each containing the person's starting date in the new department.

The salary file for Categories 3 and 4 also began with employee number and continued with fields for current salary, dollar amount of change in salary, date of change in salary, and percent of salary increase. Some employees were given more than one salary record, which provided them with a salary history.

The first tasks for Categories 3 and 4

were the same as those for 1 and 2: Store or index the employee records by last name and make an ad hoc query to the screen, extracting records by last name, employee number, and department name. In this case, to get the department name the reviewers had to use the employee number in the employee record to search for the latest department record, then pick up the department name from there. The writers couldn't immediately create a report after sorting the records by salary. For salary increases, they had to use the database's procedural language to calculate the dollar amount of change and percent of increase.

In all cases, but especially with Categories 3 and 4, we asked the reviewers to make the database perform these tasks in the way that made the best use of the software or was most characteristic of it. Occasionally a package would inch its way up to the top of its category, just falling short of inclusion in the next higher group. For instance, some of the Category 1 packages had such thorough query facilities that they appeared to belong to the second group, although they were capable working on one file at a time. These situations forced us to think carefully about our groupings, but they also ensured that we exercise each database to its fullest potential. —S.S.



Each record can have several department and detail records.

Concentric Information Processor: Easy and Expensive

WHAT CAN YOU SAY ABOUT A database package that's easy to learn and use, powerful, new and bug-free? Unfortunately, you can say that in spite of its sterling qualities, Concentric Data Systems' brand new *Concentric Information Processor (CIP)* just plain costs too much.

Concentric designed *CIP* to be easy by building in visual cues. You are not required to remember command names or even menu item numbers when you run the system. Simply use the cursor to point to what you want to do and *CIP* takes you there. It's easy, fast, and so much fun to watch that the dealer demo disk provided an evening's entertainment when the TV was out for service.

CIP's menu screens are usually self-explanatory. All currently available *CIP* options are displayed, and highlighting or underlining tells you which item will be selected if you press the Enter key. The Tab and cursor movement keys move the highlighting from item to item, and when

CIP has an annoying habit of recovering from certain disk errors by sending you back to DOS.

the desired item is highlighted, you press the Enter key to select it. A graphic display of the keys currently available for moving the cursor or selecting an option is always displayed on the screen.

Each menu screen displays quite a bit of information, usually in a format that makes it easy to read and understand. If you get confused, press the F1 key to call up the *CIP* Help screen. Unlike many help



A Concentric Information Processor (CIP) data record.

facilities, *CIP*'s is quite lucid and instructs the user with complete explanations of all currently available menu choices and the function of the displayed keys.

The Help screens go one step further—by selecting a highlighted key word on a *CIP* Help screen (move the highlight and press the Enter key), another Help screen appears and gives an explanation of the highlighted item (often with more highlighted key words and explanations). Press the Esc key and you're back to the *CIP* menu you started with, or press the F1 key to get the first Help screen.

CIP is so easy to use that the written tutorial that comes with the package proved almost useless. You can get way ahead of it by reading the menu screens. Learning to use the program this way might require an occasional look at the very well written *CIP* reference manual, but the help facility can answer almost any question you'll have.

As "Rolodex-style" database products go, *CIP* is easily one of the best. The file format is flexible and easy to define—*CIP* walks you through the process of entering

the information it requires for each item. You start by naming the field (any name up to 24 characters can be used) and telling *CIP* its length. The program displays graphic boxes as well as a number that tells you the current field length, which can be adjusted with the cursor movement keys. Then you select the item's field attributes, specifying the file key and data type, whether it is a required field, full field, and/or a unique field, and whether auto-entry should be used.

Up to 40 fields can be defined for each

Concentric Information Processor

Concentric Data Systems, Inc.

18 Lyman St.

Westboro, MA 01581

(617) 366-1122

List Price: \$395

Description: List Manager; amorphous data model.

Requires: 128K RAM (DOS 1.x) or 192K RAM (DOS 2.x), dual disk drive or hard disk.

Records per File: 65,000

CIRCLE 725 ON READER SERVICE CARD

record, and up to 10 of them may be used for the file key (only one can be the primary key). *CIP*'s field attribute list provides an adequate level of control for data being entered into the system. The unique attribute allows unique keys. (It's only available if the item is a key field.) Any field can be a required field, and any field can be a full field, which requires that it be filled out to the length you have specified. Data types include character (up to 50), numeric (12 digits, including up to six decimal places), date, and calculated. Calculated fields are specified on a separate screen and may be numeric or date calculations. The date calculations can be done in years, months, or days.

Data entry and inquiry can be performed using *CIP*'s standard screens (two may be required since only 20 items can fit on a screen), or you can define your own screen once the file has been described. In either case, the file can easily be redefined to include new items, delete old ones, and change field attributes. There is special handling for converting character data to numeric fields and numeric data to date fields.

Entering data is easy once you get the hang of *CIP*'s special use of the Enter key. It can be used to move from field to field,

which gives the data-entry process a natural feel, much like a computer terminal's. But the Ctrl key must be pressed along with the Enter key to enter a record into the file when you're done entering the individual items. The first time you use *CIP*'s data entry system, you'll undoubtedly miss a few records by forgetting to press the Ctrl key—*CIP* will merrily bounce along as you enter new data into old records.

Field attributes provide an adequate level of data screening and editing for this type of product. Required fields must be entered, and the system politely and firmly tells you so. The same goes for failing to fill out all of the blanks in a field that must be full, entering non unique data into a unique field, or entering character data into a numeric field. Calculated fields come up on the screen as soon as sufficient data are entered. *CIP*'s designers probably made lots of friends when they decided to make auto-entry optional—in other systems auto-entry can be a nuisance, especially when you're forced to manually back up to a field if you've mistyped the last character.

CIP's documentation indicates that the system can handle up to 65,000 records, but the number doesn't consider the phys-


ical capacity of a floppy disk. While a large number of records could go on a hard disk (*CIP* can operate on an XT), a floppy disk could not handle more than about 3,000 records. It's not clear what happens when *CIP* runs out of room. The program includes a data import facility—unusual in this class of product—to help you out if you're moving a large number of records from another system into one of its files. There's a matching data export facility as well.

The *CIP* Find function works quickly (2 seconds to find a random record amidst 500), but only key fields can be used to specify what you're looking for. To find records based on other data characteristics, you have to resort to using the report generator, which is much slower and more difficult to use.

The report generator is, in fact, one of *CIP*'s weak areas. It's easy to define the report format. You start with the same screen used for data entry and inquiry—either *CIP*'s standard screen or the screen you defined. To build a report format, all you do is move the data fields around to where you want them on the report, change field titles to whatever you want, and delete fields that are unnecessary for a particular report. You can even have multiple-line headers and footers that include the current system date and time.

Once the report format is defined, you set up selection and sort criteria (this was one of the few areas where the *CIP* screens became confusing). The criteria do not have to involve fields actually displayed on the report. That done, you can save your report (up to 76 can be saved for each data file), and you're ready to display or print it.

The report generator can be used for data inquiry or pure reporting. However, it is extremely slow. When data for the report generator is retrieved from disk, *CIP* apparently does not use the same access facilities used when it queries the database. For example, it took over 15 seconds to find all the records for a report in a file containing only 25 records. For



CIP is so easy to use that the written tutorial that comes with the package proved almost useless. You can get way ahead of it by reading the menu screens.

some reason, *CIP* includes a scorecard on the report screen that proudly announces when a record is (slowly) read and accepted. If you've specified a sort (up to four levels can be specified) you have to wait even longer—sorting on two fields required over 30 seconds for a 25-record file.

The report can be displayed on the screen or sent to the printer. *CIP* supports compressed printing on a limited number of printers; margins, break lines, and spaces can be specified. However, the report generator refused to insert page breaks when the printer was used unless we specified them for every record, and it only inserted the header on the first page.

When *CIP* sends the report to the screen, it comes up slowly. You have to type two keys to request the next screenful of data, but even when enough requests were inserted to produce the entire report (25 records) without stopping, it came out faster on an Okidata 2410 printer (1½ minutes) than it did on the screen (3 minutes).

CIP is a good product and it has been well tested. The only times it crashed were when it was importing data, in one case because of an incorrect format specification, and in the other because of an attempt to import data using the same drive *CIP* uses for its data disk. It generally did everything the marketing literature, the manuals, and the screens claimed it would. It made no errors or unpredictable moves when incorrect keys were pressed or an illogical choice was made (although the program does have an annoying habit of recovering from certain disk errors by sending you back to DOS).

Concentric Information Processor's only real flaw is its price. As good as it is, the program does not justify \$395. There are several alternative database packages that may not offer every bell and whistle *CIP* has but are every bit as functional and cost half the price.

That's a bug for Concentric's marketing folks to fix—the company's programmers have already taken care of most of the technical ones.—**John Dickinson**

Personal PEARL: A Package with a Flair



A Personal PEARL record and command menu.

PERSONAL PEARL'S USER MANUAL begins like this: "Mankind has traveled thousands of years to find an end to brutality and hunger, and a beginning to human fellowship and the mutual development of an advanced, nurturing civilization." It is an intriguing product. Nothing that costs three C-notes, that resides on five double-sided diskettes, that comes with over 2 pounds of documentation, and that begins with a philosophical treatise on the condition of the human race can be taken lightly. Pearlsoft's marketers pique your interest further by citing 70,000-plus sales since the product's inception just 2 years ago. Finally, if all that doesn't whet your appetite, an interactive tutorial that covers the package from A to Z demonstrates the power of PEARL with a flair that would make a Madison Avenue advertising executive envious.

The other intriguing aspect of this package is the mystery of cracking the shell that surrounds it. I spent 2 hours trying to figure out how to enter one character into a form I had designed. I thought such

mental gymnastics were reserved for computer chess games and machine code debugging—not information management systems.

The PC version of PEARL has a number of pitfalls, and, in order to understand them, a few words about the product's background are helpful. The program was developed before the PC existed. Its first installations were on CP/M-80 systems that included a lengthy array of hardware. The authors of the documentation wrote a generic manual to accompany the software. It makes no references to specific

Personal PEARL

Pearlsoft
25195 S.W. Pkwy.
Wilsonville, OR 97076
(503) 682-3636
List Price: \$295

Description: Relational, but handles only one file at a time.

Requires: 128K RAM, two disk drives.

Records per File: Limited only by operating system and media.

CIRCLE 726 ON READER SERVICE CARD

machine environments.

In itself, this breaks no laws or codes of conduct. As the months passed, though, the *PEARL* software was massaged, tailored, and shoehorned to fit into an expanding sphere of hardware, which eventually included the PC. At the same time, the generic documentation, which in the early days worked quite well, no longer completely agreed with the software. Nonetheless, it was shipped with the product. Therein lies *PEARL*'s greatest shortcoming on the PC.

What discrepancies crop up between the software and documentation? On the bottom line, they amount to less than a handful, but they can throw you for the proverbial "infinite loop" if you're not careful.

For instance, when I first attempted to add data to a form, I began by verifying the distribution media of five diskettes labeled Welcome, Library, Sort, Data, and Forms. I then, as instructed, placed the Forms disk in the A: drive and the Data disk in the B: drive. The design of the form went smoothly, which, as I expected, *PEARL* saved on the B: drive.

Next, I tried to add data to the form. *PEARL* asked for the Data disk in the A: drive. I dutifully removed it from drive B: and inserted it in drive A:. The program asked for an Application disk in drive B:. Application disk? There was no such thing. I presumed it wanted the Data disk, the only disk that contained my file, so I switched it from the A: to the B: drive.

This appeared to satisfy *PEARL*, but it again asked for the Data disk in the A: drive, which I had just removed from A: to put in B:. What is this, I thought, a new version of the game *Adventure*?

At this point, I regrouped, repeated the installation procedure, studied the help screens with a magnifying glass, and read the user's manual every way but upside down. Still, I was hopelessly mired in the same predicament.

In desperation, I called Pearlsoft on a Saturday evening. The phantom Applications disk turned out to be a sixth disk, in



An interactive tutorial that covers the package from A to Z demonstrates the power of *PEARL* with a flair that would make an advertising executive envious.

addition to the five distribution disks. You create it by initializing a null disk under DOS, and the forms you subsequently create are placed on that disk.

With that information tucked under my hat, I was able at last to enter my 25 records of employee information. Time to input data: 40 minutes. Time to figure out how to input data: more than 2 hours.

I was resentful about this unpleasant introduction to *PEARL*, but once I cracked the code, I discovered considerable power in the program. I now understand why it attracts such a wide following.

All of *PEARL*'s menus greet you with a familiar face—they're mirror images of *WordStar*. Control-E moves the cursor up. Control-X moves down. Control-A and Control-F move left and right one word, respectively. I almost expected to see *MailMerge* on the menu.

WordStar users will feel right at home with this clone. Having a working knowledge of *WordStar*, though, is by no means a prerequisite for *PEARL*. The arrow keys also manipulate the cursor.

PEARL's ability to handle up to nine screens and nine external files through one form is probably unmatched in its price class. A single form may range up to 20,000 characters—a generous allotment that should more than cover the FBI's most punctilious dossiers.

In data entry editing, *PEARL* has only three capabilities: mandatory, numeric, and date fields. The total selection is meager. However, this is the first program I've come across that tests dates in an intelligent manner. *PEARL* checks the day portion of a date based on the month. For example, in August the day may range up to 31, but in September the day must be 30 or less. The program even makes allowances for leap years. It accepts a date of February 29 in 1984, but not in 1983.

Whether or not one should prescribe this program to cure information management ills depends on several factors. First, running *PEARL* without a hard disk is like mounting the Space Shuttle on a weather balloon. You need an XT environment.

If you've tasted *PEARL* on another computer, then you've probably already formed an opinion. The PC version will appear identical to its non-PC cousins. The possibilities of using *PEARL* across machine boundaries is a consideration for those who deal with a variety of hardware.

To summarize, take a close look at *PEARL* if you're in the market for a relatively sophisticated system that you intend to execute from a hard disk. On the other hand, if you need a disk-based or personal filing system, using *PEARL* is overkill.

In any case, be forewarned that the perils of *PEARL* lie in the documentation. If the system fails to fire up after a few vigorous cranks on the starter, don't hesitate to call Pearlsoft's customer support service. After all, you're paying for it!

—Edward Joyce

OMNIFILE: Limited Applications

OMNIFILE IS NEITHER FISH NOR fowl. Targeted at the middle ground between easy-to-use list management programs and higher-performance database management systems, is relatively easy to use, and its tutorial manual gets you through the basics fairly quickly. On the other hand, the program has some complex features and extensive capabilities.

This fusion of features certainly sounds appealing. But while it is easy to make use of *OMNIFILE*'s simpler features, some aspects are difficult to master. And while the complex features are nice to have, these powerful utilities are pointless since the program lacks the ability to relate different data files to one another. *OMNIFILE* is excellent at what it does, but the combination of features will suit only a small handful of users.

OMNIFILE's complex installation procedure branches repeatedly depending on the hardware configuration you have. The manual deserves credit for explaining this potentially confusing start-up procedure, and batch files on the disk ease the way. Still, the 17 pages that the manual allots to installation represent the monumental problems that can result from copy protecting programs.

Once you're into the program you can quickly begin to design your data entry screens, which are contained in "forms."

OMNIFILE

SSR Corporation
1600 Lyell Ave.
Rochester, NY 14606
(716) 254-3200

List Price: \$425

Description: Relational, handles only single files.

Requires: 128K RAM (DOS 1.x), 192K RAM (DOS 2.x), two disk drives.

Records per File: 4,000,000

CIRCLE 727 ON READER SERVICE CARD

Each file or set of similar files has a master form, and related forms can access the same file. Each form may contain between

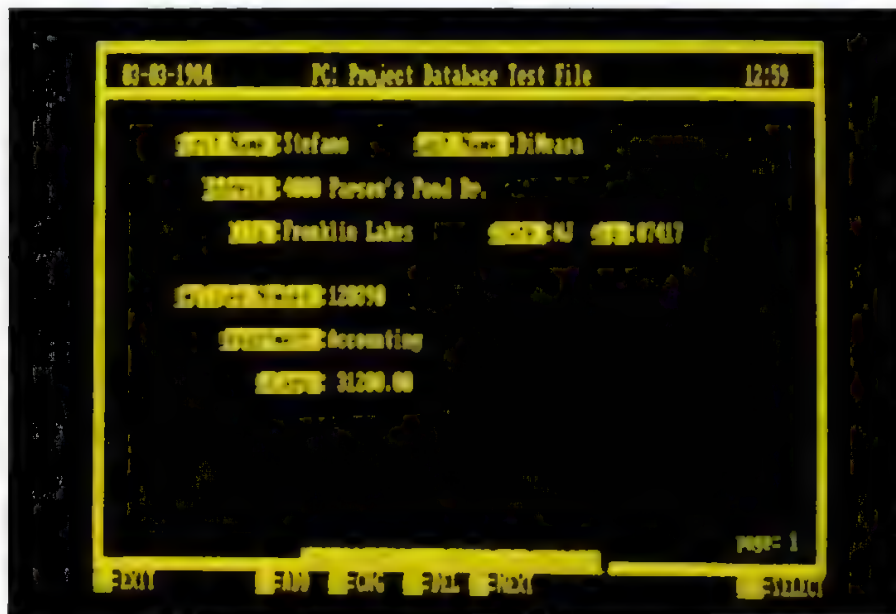
OMNIFILE is excellent at what it does, but the combination of features will suit only a small handful of users.

one and twenty separate screens. This structure lets you design a large file with many fields and then create many different data entry screens, each of which only works with a few of the fields. You can protect files with an extremely flexible password system that is definable in terms of both read and write access down to a field-by-field basis. Using these features, you can include a wide variety of types of data in a file and still limit access to the

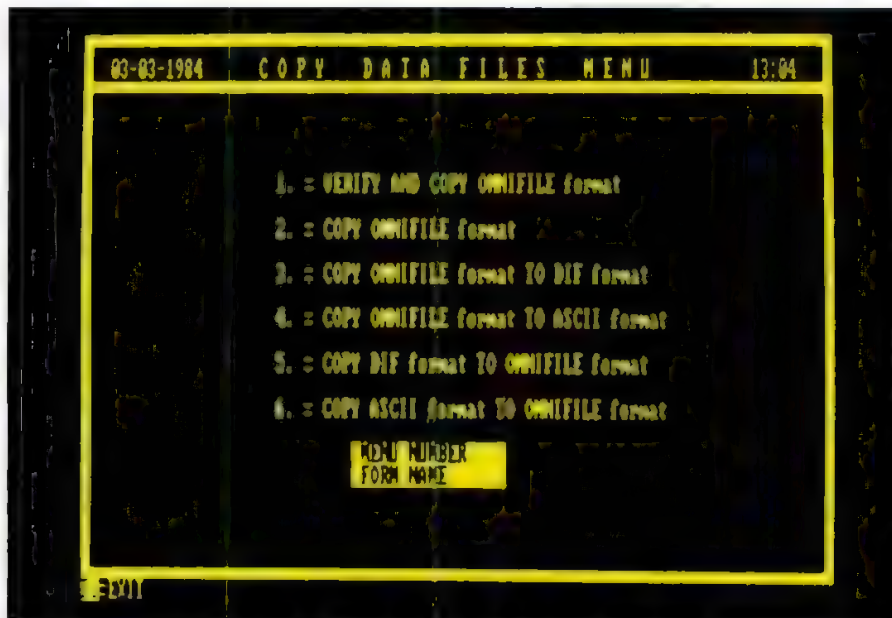
different parts depending on who will work with it.

Designing the screens is one of the best parts of *OMNIFILE*. Variably shaped brackets define the type of field (alphanumeric or numeric), and you put the field length between the brackets (for example, <6>). When you type the closing bracket for a field, *OMNIFILE* immediately expands the field space on the screen and fills it with the appropriate number of dashes. You don't have to sit there pressing the hyphen key and muttering "1,2,3,4,5,6" to define the field length. You can even define a field to fill the entire screen if you need to enter an entire page of text.

Data entry is fairly standard. It allows you to repeat the data entered for a given field on a previous screen. One of *OMNI-FILE*'s outstanding features is its ability to read and write both DIF (Data Interchange Format) and text files. In the text files, alphanumeric fields must be in quotes, all fields must be separated by commas, and all records must be separated by carriage return/line feed characters. The two for-



An OMNIFILE record.



OMNIFILE's menu for copying data files to various formats.

mats for data interchange make it easy to move data back and forth with other programs.

OMNIFILE has some other attractive features. You may split and merge data files, update all or selected records in a file, and make calculations "on the fly" for the update. For example, you can increase the prices for all products from a given supplier by 5 percent. Utilities allow you to take full advantage of your hardware. For example, you may set the foreground and background colors not just for the screen in general but also for different combinations for field titles and data.

A separate module called Anyreport is a fast and flexible report formatter that allows you to select fields, their order, and conditions for selecting records you want to include. You must select one of two index keys or define your own sort using up to four fields. Page breaks and breaks with subtotals are available. You can send the output to the printer or the screen; if you send it to the screen, the report width may not be more than 80 characters. The report section has only one major shortcoming: a record may only be printed on one line. You may not split records so that some fields print on the first line and more

print on a second.

OMNIFILE's fairly good documentation is attractively designed and well laid out, with major sections separated by small tabbed dividers. The writing is clear and easy to read. The bulk of the manual is a tutorial that leads you through all aspects of the program. A separate reference section does not exist, so you must rely on these narrative instruction sections if you need to review a procedure. The index appears to be adequate.

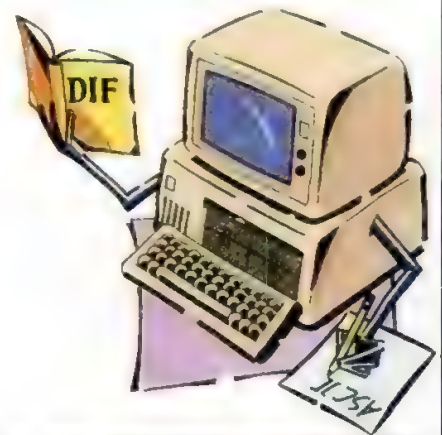
The manual also includes more than 40 pages of sample applications for different professionals including doctors, lawyers, personnel officers, contractors, insurance agents, and even ministers. This excellent section illustrates how the program may be used.

The sample applications also reveal that OMNIFILE is limited in spite of its advanced features. For example, the medical records section contains two separate files for patient information: one for appointments and one for prescriptions. Much of the same information must be entered into each, but there is no way to link the information between the files.

OMNIFILE's manufacturer, SSR, is one of the leaders in the new trend toward

inexpensive demonstration versions of complex programs. For \$15 (plus \$2 for shipping), SSR will send you a three-disk demo including documentation on disk. The demo is a full-featured version of the program, but you are limited to 5,000 characters per file. Unlike the full-priced version, the demo is not copy-protected, and the company actually encourages you to make copies of it and pass it on to friends and colleagues. This policy makes it feasible to try out this relatively expensive program with little risk.

Many other programs can do almost as much as this one at a much lower price, and there are similarly priced programs that can do much more. If the reporting and file limitations don't bother you and you need some of the other special features OMNIFILE offers, the demo should help you decide whether or not this is the program for you. —Alfred Poor



The demo is not copy protected, and the company actually encourages you to pass it on to friends and colleagues.

FormManager: A Noble Effort

Department	Salary	Name			
Production	20900	Davies			
		22 Punta Del Este Dr			
		La Puente	Gwen	CA	91745
		504838			
Production	25100	Craig			
		1899 Abilene St			
		Aurora	Don	CO	80011
		594303			
Production	25300	Kincaid			
		9 Nye Rd			
		Cattanooga	Don	TN	37405
		403840			
Production	25700	Curtis			
		28 Herbert Rd			
		Boston	Neil	MA	02178
		403940			

A short report from *FormManager*.

THE MANUFACTURERS APPEAR TO have expended considerable effort in developing *FormManager*—it's a shame that the result couldn't have been a better product. The problems start with the pair of keyboard templates supplied for each of the two main operations, the forms editor and the data file manager. They don't quite fit the keyboard, and that sets the tone for the rest of the package.

FormManager's main menu is a batch file, which in itself is not bad. However, it leaves you lying back in the operating system, A> prompt and all. Also, the programs you choose from its list are also batch files; that sort of system has inherent weak points, because every time you switch back to the main menu, you tend to forget which drive you've selected for data

and even which file you've been working with. Use of this technique indicates a basic lack of understanding of programming, of people, and of the PC itself.

Creating *FormManager*'s input form entails using two PC function keys designated Mark and EndMark. When pressed, they highlight a section of the screen you have "marked off." You can then specify what data belongs there, as well as a range of values for numeric items and a default value. You specify these values using four of the function keys—five if you count the one you use to get help if you're not using the templates. There are function keys to delete a field or quit, and combinations of Alt and other keys that add more complexity to the command system. All the while, a one-line prompt at the top of the screen appears and disappears at what seem to be random intervals.

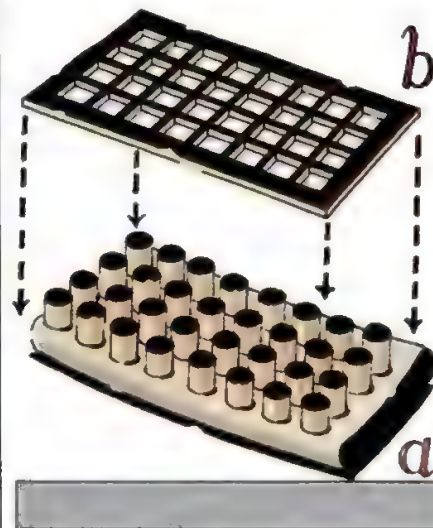
FormManager has no data import features. They are scheduled for the next release, although the database file is in standard sequential form with a variable length header containing the field names and indexing information.

Editing the information in a record is simple. Unless you use another function key to create a second record, you're locked into the first. Either the Return or cursor keys will advance you from field to field. Deleting a record is also done with a function key, with one exception. When

you get down to the last record, you can't delete it. At that point, the program seems to think there are no more records.

Putting out a report is not difficult either. The data can be printed in two formats, either as a mailing list or as standard multiline output. You can set up the multiple field sort and report features using *FormManager*'s report module, again using function keys and Alt modifiers. Advancing to a new line is done by specifying a column number that you have already used in the report.

I did encounter a problem in setting up the standard report. No matter how many times I assigned the last-name field as print field 4, the program reassigned it as print field 7. In fact, it switched several of my field assignments—always consistently. Apparently *FormManager* has a problem printing multiline reports when one of the fields in a lower line begins after the last column of an upper line. The format variable that tracks the current available



column doesn't work reliably either.

FormManager is indeed a noble effort, but the package doesn't work. The templates don't fit the keyboard correctly—an errant pinky can cause them to catapult off the function keypad.

All in all, *FormManager* is well thought out, but poorly implemented.

—Bill O'Brien

FormManager

Bit Software, Inc.
P. O. Box 619
1048 Nicklaus Ave.
Milpitas, CA 95035
(408) 262-1054

List Price: \$195

Description: Form-oriented, amorphous data model.

Requires: 64K RAM (DOS 1.1) or 128K RAM (DOS 2.0).

Records per File: 32,767.

CIRCLE 728 ON READER SERVICE CARD

Creatabase: For Home Use Only

SETTING UP A FILING SYSTEM with PCSoftware's *CREATABASE* requires little, if any, knowledge on the user's part. From the moment the program is booted, you are confronted with easy-to-follow menus and prompts. Numerous help screens are available, too. This ease of use and the \$75 price tag make *CREATABASE* a suitable package for home management use.

Home use are the key words here. The program lacks too many features for serious business applications. To begin with, it does not perform any calculation functions; it cannot be used to maintain financial records that need updating. Also, since it lacks the ability to interface with other programs, *CREATABASE* cannot be used with *1-2-3* or *WordStar*, or others. Finally, although there is an input type for the date, the program doesn't edit for it.

Despite these drawbacks, *CREATABASE* is an excellent choice for those who are only beginning to use database programs or have minimal data requirements.

Entering file description specifications

is accomplished by selecting the first option (Create/Change a File Description) of the main menu. The description screen allows for only three entries: the field's name, type, and length. Other options accessible from that screen allow a field to be stored under a key, an input screen to be designed, and a file specification model. This last feature allows you to reconfigure your filing system without manually re-entering all the specifications.

Input screen design is accessed by hitting F6 while on the file specification screen. Both text and field information are allowed. The user simply enters the field number or a letter (for text) and the row and column. Field names can be masked or overlaid with a text string. The maximum length of a text string is 32 characters.

File maintenance is accessed through the Process Menu (Option 2 on the Main Menu) and permits adding, viewing, updating, and printing of records. Output can be directed to the printer, screen, or disk. Options also exist for verification, selecting all or some records, and process-

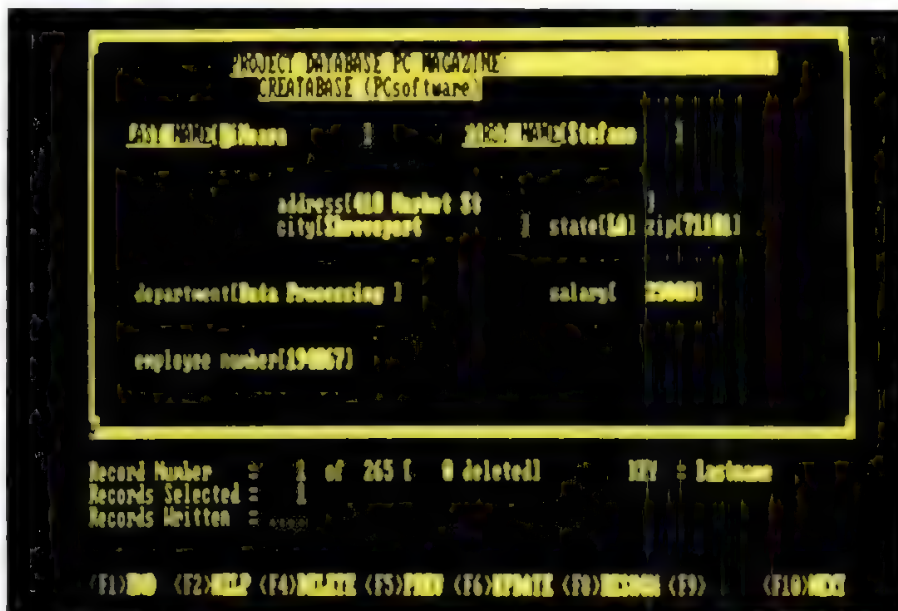


ing order (keyed, record number, sorted). If the file needs to be rekeyed after updating, the menu flashes a prompt. F1 cancels selections you have made, and F10 begins the process program.

When adding records, the user enters the pertinent data onto the input screen designed during the file specification procedure. The function keys permit the user to add, return to the previous, or move to the next record. Three advanced features allow the user to enter the date (Ctrl-R), copy fields (Ctrl-F) and copy entire records (Ctrl-R). You must, however, verify the date yourself.

The Selection Screen may be used when viewing, updating, or outputting records. Up to two sets of criteria can be selected. Only six operands are available: NOT, less than (<), greater than (>), equal (=), in the range of (—), and contains (?). The values entered must match the values of the record exactly.

Once matches are found they can be



A *CREATABASE* record.

CREATABASE

PCSoftware

912 Gramercy Dr. #416

San Diego, CA 92123

(619) 279-2482

List Price: \$75

Description: File manager.

Requires: 64K RAM (DOS 1.1), two disk drives.

Records per File: 1,200 in a 64K file; 2,200 in a 128K file.

CIRCLE 729 ON READER SERVICE CARD

Input Screen Specification

Method	Capabilities				
	No. screens per file	No. files per screen	Simulate paper forms	Link help messages/ prompts to a field	Master/detail relationships
Automatic (fixed). This is standard if user does not want to specify own screen. "Painted" User can specify own screen.	Up to 2 screens may be needed to define one file (20 fields per screen, 40 per file—2 screens needed)	1	Can do it exactly if you specify your own screen (screen definer is pretty flexible, including different titles for fields).	Not your own, but CIPs are quite helpful; however user must remember to use them	—
"Painted"	One file can consist of 9 screens. One file can access or extract data from 9 other, external files.	1	Yes	No	No
"Painted"	Unlimited "forms" per file, with up to 20 screens ("pages") per form.	1	Yes	No	No
Auto-default optional	1	1	No	No	No
Field specs are on a fixed screen, but input screen is designed by user during file specification	1	1	Yes	Yes	No
"Painted"	1	1	Not readily	Screen comments	None
Automatic/ "Painted"	1	1	Yes	Can be done with stored scripts.	No
Automatic	2	1	Yes	No	No
Fixed	1	1	No	No	No
Automatic (fixed). Asks for name, then length—nothing else. Function key enters date	1	1	Not on input	Occasional help. Most menus and screens are prompted.	Calculated fields are related to each other
"Painted"	1	1	Yes	No	No

1. Follow instructions on the other side

Back

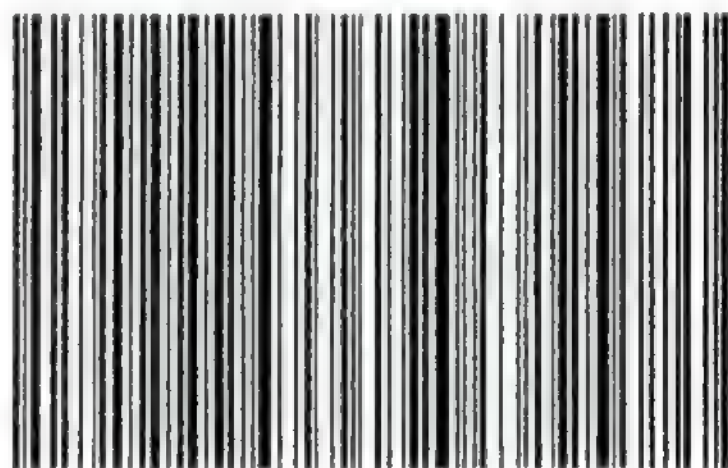
Gbs5lipBack-0018



Inverted Back

1. Follow instructions on the other side

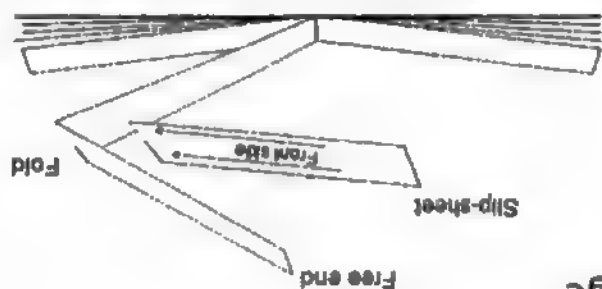
Folded edge of the page



GbsSlipSheet-001

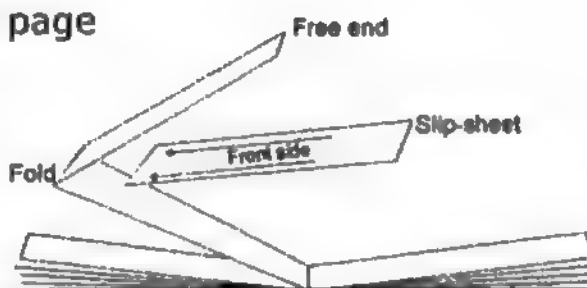
Foldout slip-sheet

1. Open the foldout page
2. Insert this sheet with
1. Front side touching the free page
2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet



Inverted Foldout slip-sheet

1. Open the foldout page
2. Insert this sheet with
1. Front side touching the free page
2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet



Name	Data Model	Marketing Features		
		Length of Time on Market	Number of Sales	Price
CIP (Concentric Information Processor) Concentric Data Systems, Inc. 18 Lyman St. Westboro, MA 01581 (617) 366-1122	Flat file	Since March, 1984	Less than 1,000	\$395
Personal PEARL Pearlsoft 25195 S.W. Pkwy. Wilsonville, OR 97076 (503) 682-3636	Relational, but only operates on 1 file at a time.	Since September, 1982	70,000	\$295
OMNIFILE (Version 1.4) SSR Corp. 1600 Lyell Ave. Rochester, NY 14606 (716) 254-3200	Relational, but handles only 1 file at a time.	Since November, 1983	Proprietary information	\$425
FormManager Bit Software, Inc. 1048 Nicklaus Ave. P.O. Box 619 Milpitas, CA 95035 (408) 262-1054	Flat file	Since mid 1983	150	\$195
CREATABASE PCSoftware 9120 Gramercy Dr., #416 San Diego, CA 92123 (619) 279-2482	File manager	Since 1982	1,500	\$75
FAST FACTS Innovative Software, Inc. 9300 W. 110 St., #380 Overland Pk., KS 66210 (913) 383-1089	Flat file	Since July, 1983	600	\$195
NPL (Non-Procedural Language) Desktop Software Corp. 228 Alexander St. Princeton, NJ 08540 (609) 924-7111	Flat file	Since February, 1981 for Apple and since March, 1983 for IBM PC.	800	MS-DOS version is \$500.
Magictable Presta Digital 10 Bridge St. P.O. Box 7192 Lowell, MA 01852 (617) 458-4070	Relational, but handles only 1 file at a time.	Since October, 1983	"A couple hundred"	\$159
PC-FILE III Buttonware P.O. Box 5786 Bellevue, WA 98006 (206) 746-4296	Flat file	Since mid 1982	About 50,000	\$45
Data Base Manager II (Version 1.3) Alpha Software 30 B St. Burlington, MA 01803 (800) 451-1018	File manager	Since June, 1983	About 20,000	\$295
ResQ (Version 1.1) Key Software, Inc. 2350 E. Devon, #138 Des Plaines, IL 60018 (312) 298-3610	Flat file	Since March, 1983	2,500	\$295

viewed for either updating or outputting. When updating, the records are displayed on the input screen. In addition to displaying the record itself, the program also prints out the record number, the number of records that met the criteria, the number of records written to an output device, and the number of records deleted. Although deleted records are only hidden from the program and not physically removed, *CREATABASE* has no capabilities for reaccessing them if necessary.

Before printing records, the print parameters must be set. Available features include condensed type, page breaks, lines per page, single or multiple records per line, page headings, and the record width in inches. From this screen, the user can move on to the print layout screen. As with the input screen, both text and fields are entered. Fields can be put in the report more than once. Fields can contain more than one report form description and parameters can be passed.

Through the Utility Menu, the user can access a disk directory program, make or change a key field, print records to the screen or the printer, configure the hardware, convert files, and run a sort. *CREATABASE* sorts up to three fields at a time, with a maximum of 16 characters being compared. Only one sorted file is maintained per disk. If more are desired, the actual sorted data file may be converted onto another disk. Conversion requires the user to match fields being converted. This means that fields can be swapped, deleted, and added.

For the most part, PCsoftware's *CREATABASE* runs quickly and easily. Once I crashed the system and incurred an "unrecoverable" error message, but I didn't lose any data. Error trapping is adequate and even gross input errors don't cause the system to go into a loop.

The program fails only in its omissions. The lack of calculation and integration capabilities diminishes the number of prospective users. But then again, at \$75.00 *CREATABASE* does provide its share of features. —Vincent Puglia

Fast Facts: Speedy, But Frustrating

Last Name	First Name	Address	City	State
Banning	David	100 Catherin	Cincinnati	OH
Bayliss	George	27 Lenbrook	Knoxville	TN
Bittner	Herb	109 23rd Ave	Upper Darby	PA
Bradford	Eugene	888 Centre P	Lincoln	NE
Brady	Anna	99 Spruce Pl	Evansville	IN
Carver	Abe	101 Mayflowe	Baton Rouge	LA
Chandler	Liz	255 Denise R	Norristown	PA
Condon	Roberta	9 Oak Valley	Chattanooga	TN
Craig	Don	1899 Abilene	Aurora	CO
Curtis	Neil	28 Herbert R	Boston	MA
Davies	Oliver	8 George Dr	Norristown	PA
Davies	Gwen	22 Punta Del	La Puente	CA
DiMeara	Stefano	410 Market S	Shreveport	LA

A FAST FACTS report.

THERE ARE TIMES WHEN PROGRAMMING fluff—little features that take advantage of sights or sounds peculiar to one computer—can be used to good effect. These features add identity to a program and indicate that the authors understand the equipment used. When implemented correctly, these features can hide minor flaws in programming design and complement good work. They can also be carried to extremes. Fortunately, *FAST FACTS* is in the first category.

With *FAST FACTS*, designing input screens, the framework on which your database rests, is no more difficult than selecting a spot on the screen and "painting" what you want. *FAST FACTS* permits you to put characters anywhere your cursor wanders. Actually, you're permitted to use three types of characters in designing any of the 50 screens you can use to acquire data.

FAST FACTS

Innovative Software, Inc.
9300 W, 110 St., #380
Overland Park, KS 66210
(913) 383-1089

List Price: \$195

Description: Amorphous data model.

Requires: 64K RAM (DOS 1.1) or 128K RAM (DOS 2.0).

Records per File: Limited only by disk size.

CIRCLE 730 ON READER SERVICE CARD



With *FAST FACTS*, designing input screens is no more difficult than selecting a spot on the screen and "painting."

(Text continues following the Database Chart.)

Entry Editing Capabilities

None	Range Tests	Specific Values	Default Values	Table Lookup (To an Outside File)	Verify (Requires Data to Be Input Twice)
—	No	No	Yes, from previous record(s) entered.	No	No
—	No	No	No	No	No
—	No	No	No	No	No
—	Yes	Yes	Yes	No	No
—	Yes	Yes	Once a database has been created, the specs can be used as a model; otherwise, default is a blank field.	No	Optional
None	—	—	—	—	—
—	Yes	Yes	Yes	No	No
None	—	—	—	—	—
—	No	No	No	No	No
—	No	No	No	No	Through function key only (optional).
—	No	No	No	No	No

			Adaptation To PC		
Required Field	Date Tests/Date Conversion	Other	ASCII Characters Only	Graphics Symbols	Color
Yes	Can convert numeric data to dates from DIF format imported files. Date field requires valid data.	Auto entry is optional, and user can specify field uniqueness (key fields only), and can specify that field must be full (all characters entered for, e.g., a zip code entry.)	In data fields	Not allowed in data, but CIP uses them nicely on its screens.	No
Yes	Tests—yes, ensures month ranges from 01 to 12 and day ranges from 01 to 28, 29, 30 or 31 depending on month and whether or not year is leap; conversion—no.	Can specify "numeric only" fields.	Yes	No	Yes
No	No	No	No. Limited graphics.	Limited graphics	Not required, but configurable.
No	No	No	Also line or box graphic characters.	Line/box	No
No	No	Records and/or fields can be copied from one record to the immediate next and from one database to another.	No	No	No
—	—	—	No	Yes	Yes
No	No	No	Yes	No	No
—	—	—	Yes	No	Yes
No	Automatic date and time	—	Yes	No	No
No	No	Records can be re-edited by pressing a function key.	Function keys are programmed to enter date, exit to main menu, etc.	No	No
No	Ensures month ranges from 01 to 12 and day ranges from 01 to 31. Does not do conversion.	Can specify "numeric only" fields. Can duplicate fields from previous record.	No	Draws boxes.	No

					User Interface	Files
						Method of
	DOS 2.x Subdirectories	Alternate Input Methods (mouse, etc.)	Files Across Multiple Drives	Function Keys		Data dictionary or other means
	No, specifically not allowed to put data in subdirectory, although program and data may be in subdirectory on hard disk	No, makes excellent use of cursor keys instead	No	Some use, but depends more on menu selection facility	Prompting/visual	User screen presents field descriptions, but not meaning of content
	Yes	No	No	Uses function, arrow, Home, End, Pg Up/Dn, Ins, Del, & PrtSc keys	Menus	No data dictionary
	No	No	No	Yes	Prompting/visual	Built as master forms being created
	No	No	No	Only for menu selection.	Visual	File specs are in header of data file
	No	No	When converting fields to new database, two drives can be used	Are used but are not programmable	Visual	User input or by converting 1 set of specs to another
	No	No	No	Available for menu selection.	Visual	No
	No	No	No	No	Natural language but only if you're a trained programmer	No
	No	No	No	Yes	Verbal/prompting	Yes
	No	No	No	No	Visual	No
	No	No	Yes	Yes	Prompting/verbal	Field name and length only
	No	No	No	Uses function keys, and other PC keyboard keys	Menus	No

Specification	Things You Can Specify				
Must files be built/modified only from data dictionary?	Name	Field data	Tokens, aliases, or synonyms	Index data	Permissions/security
Yes, in sense that 'dictionary' is described at left	—	Yes	Alternate screens can use different names	Up to 10 are allowed, and uniqueness is allowed but not required.	Password is allowed and may be removed by a utility if you forget it.
—	None	—	—	—	—
Yes	—	Name, length, and type.	No	Up to 5 fields for each of 2 indexes.	Passwords available by file and by field Permissions available for read and for write access.
—	None	—	—	—	—
—	None	—	—	—	—
—	None	—	—	—	—
—	—	Yes	Yes	Yes	No
Yes	—	Name, length, and type.	No	No	No
—	None	—	—	—	—
—	None	—	—	—	—
—	—	Character or numeric	No	No	One password level for files, up to 9 password levels for fields.

					System
					Maximum No. Record Types per Database
Encryption	Relations	Validity tests	Error or prompting messages	Multiple views of database	
No	No, but calculations can be specified that will occur on input.	No, just character, numeric, and date.	No	No, but may have alternate views.	1
—	—	—	—	—	Limited by capacity of operating system directory.
No	No	No	No	Available through use of different forms and screens.	1
—	—	—	—	—	1
—	—	—	—	—	1
—	—	—	—	—	1
—	—	—	—	—	1
Compression of numeric fields.	No	In procedures	In procedures	No	1
No	No	No	No	No	1
—	—	—	—	—	1
—	—	—	—	—	1
No	No	No	No	No	Limited by capacity of operating system directory.

Specifications					Error Handling
Maximum No. Fields per Record	Maximum Record Size	Maximum No. Records per File	Maximum No. Records per Database	Maximum Field Size	
40	2,000 characters	65,000 (about 3,000 per disk).	—	50 characters or 12 digits	Field by field, but not user specified (except to extent field data was specified)
250	20,000 characters	Limited only by operating system and media.	—	80 characters	Field by field and selective reprompting
64 plus "attachment page"	Not specified	4,000,000	—	1,828 bytes	Default and total reprompting
100	8,000 characters	32,767	—	80 characters	Field-by-field
16	992 characters	1,200 records in a 64K file, 2,200 records in a 128K file.	—	62 characters	Field-by-field
100	96,000 characters	Whatever the disk will hold.	—	Not specified	Total reprompting
100	4,000 bytes	3,600 records, 100 bytes per record.	—	999 bytes character, 16 digits floating, 5 digits fixed.	Field-by-field
32	512 characters	32,767	—	10 for numeric, 62 for characters.	Default and total reprompting.
41	254 characters	Whatever the disk will hold.	—	65 characters in most cases.	Field-by-field only for data type. Total reprompting otherwise.
40	2,400 characters	Based on memory limitations.	—	60 characters	Selective reprompting at point of error.
60	1,048 characters	32,767	—	80 characters	Field-by-field and selective reprompting

Data Types and Maximum Sizes

Character	Numeric				Date
	Integer	Floating point	Money or dollars	Other numeric	
50	12 digits	12 digits with up to 6 of these to right of decimal point.	As floating point	Calculated dates (years, months, days); calculated numeric.	Yes
250	16 places; decimal point and minus sign count for places.	No	Yes	No	Yes
1,828	No	16 digits	No	No	Yes
1,828	Yes	Yes	Yes	Yes	No
Alphanumeric and capitals	Yes	No	No	No	Yes, but not automatically edited.
Alphanumeric	Free-form entry	No	No	No	No
999	Range: + or - 32,767	16 digits	Up to \$11,000,000,000	No	No
62	No	Yes, 10 digits, including decimal.	No	No	No
Alphanumeric, numeric, date, time (automatic).	Alphanumeric, numeric, maximum of 65 characters.	Yes	No	No	Yes, automatic entry.
Since program doesn't specify data types, anything can be input. F9 inputs current date.	Program doesn't differentiate on input.	Program doesn't differentiate on input.	Program doesn't differentiate.	Program doesn't differentiate.	Yes
80	13 places, 8 of which can be to right of decimal point; decimal point and minus sign count for places.	No	No	No	Yes

		Demo Version			Data Importing
Time	Logical	Available?	Cost	Limitations	
Yes	No	Dealer demo is meant to be copied for prospective customers—includes tutorial as well as demo.	None	Just a tutorial, not a workable product.	ASCII and DIF
No	No	No	—	—	Requires extra utility program costing \$100.
No	No	Yes	\$15 + \$2 shipping	5,000 characters per file, instead of 16,000,000.	ASCII and DIF
No	No	No	—	—	No
No	No	No	—	—	No
No	No	No	—	—	SDF—must know number of fields in import file.
No	No	Yes, with return option.	\$15	40 records	Unlimited ASCII sequential files.
No	No	No	—	—	Somewhat SDF compatible
Yes, automatic entry.	No	No	—	—	DIF, ASCII, MailMerge.
Program doesn't differentiate.	No	For retailers mostly.	\$5	7 minute, self running demo. No interaction.	Standard format: DIF, ASCII. Special format: SYLK, DEX, Lotus' 1-2-3, MailMerge, Multiplan (via ASCII).
No	No	Yes	Free	—	ASCII fixed, with each field found in same relative position in each record.

Data Exporting	Advanced Features				
	Back-up-ability/ Copy Protection	Audit Trails		Data Restructuring	
		Pre/post imaging	Activity or transaction log	Technique (Inherent/ separate program)	Adding or changing indexes
ASCII and DIF	DOS or C.I.P. archive utility for data. Program may not be backed up.	No	No	Inherent program is easy to use. Character fields can be converted to numeric.	Yes
ASCII and SuperCalc formats	Program disks not copy-protected	No	No	Separate program included with package.	Yes
ASCII and DIF	Yes; a backup set of 2 additional program disks are sent upon receipt of warranty card.	No	No	Separate module within program.	Indexes not maintained in restructure. Adding/ changing indexes permitted.
No	No copy protection	No	No	No	No
Can export data to BASIC programs.	No copy protection	No	No	Through the main menu and into the convert utility.	Can easily change key.
SDF	No copy protection	No	No	Inherent	No
Flat, fixed-file ASCII format can easily be read by most other programs' import functions.	Internal backup, but DOS copy is easier to use. Not copy-protected.	No	Yes	Inherent and separate programs, but probably easier to do it by hand.	Yes
No	No backup ability, but has copy protection.	No	No	Inherent	No indexes, must re-sort.
SDF and DIF	No copy protection	No	No	Inherent	Changing but no adding.
Same as importing	No copy protection	No	No	Via main menu—field names and lengths can be changed. Fields can be added, deleted, reordered in the reconfiguration screen.	No
ASCII and Lotus' 1-2-3 format	Program disks are not copy-protected.	No	No	Separate program included with package.	Yes; fields from two files can be joined to form a new file.

		Report Generation			
Linked or Multiple Update of Indexes and Files	High-level Language &/or Product Interface	Capabilities			
		Sorting	Aggregates (min, max, count, avg., percent, etc.)	Arithmetic (+, /, +, -)	Parameter passing
Only on calculated fields.	No	Up to 4 sort fields	Total, count, average	All 4 operations	None
No	No	Up to 5 sort fields	None	Calculations include +, -, *, /, subtotalling on numeric fields. Number of calculations, subtotals, & totals ultimately limited by available memory.	Report title, lines/page, number of forms left to right, & page numbering.
Multiple update available. Indexes maintained.	No	Up to 4 sort fields	Can do aggregates by row; columns can handle totals and averages only.	Yes, by row only.	No
No	No	Yes, for 1 sort field.	Yes	Yes	No
You change the key, and CREATABASE does update automatically.	To BASIC	Up to 3 sort fields at a time, maximum of 16 characters per field.	No	No	Print parameters only.
No	No	Yes, for standard report.	Yes	Yes	No
Yes	To program's own macros	Up to 10 fields for sort or selection.	Min, max, first, last, count, total, average.	Yes	No
No	No	Up to 2 sort fields.	Available, but must use all or none.	Within records only, by rows.	No
No	No	No	Yes	Yes	No
Global search and replace	All application programs mentioned in import/export.	2 sorts are provided—one in-memory (2,500 records max), the other on disk (up to 40 fields/80 character per field).	Average. Comparison based on dates.	Yes	Yes. Can be used to generate form letters with a word-processor or EDLIN.
No	No	None; must create new index to print file in order other than original index.	No	Up to 10 calculations per report; totaling on numeric fields.	No

		Query Language			
Flexibility of output	Multi-file access	Mass additions, deletions & updates	Load and unload	Execute stored scripts	Quality of output
Very flexible—header/footer, field relabeling, picture formats.	No	No	No	No	CIP's standard, or can design own.
To screen, printer, or disk file	Yes	No	No	Yes—low and high values can be specified for each field to select records for reporting.	Good
Can request sub-totals and new page on control break. Can do labels and 1-page merged form letters.	No	Yes	No	No	Good
Single file, multiple reports.	No	No	No	No	Adequate
Screen-one record displayed at a time. Print output—single and multiple records per page, page breaks, condensed type, headings. Disk reports can be output to the same or another disk.	No	Yes, via filter.	No	No	Good
Adequate	No	No	No	No	Adequate
Adequate	No	No	No	NPL procedures	Ugly
May re-arrange column order.	No	No	No	No	Good
Adequate	No	No	No	Yes	Adequate
Adequate	No	Yes	No	No	Adequate
Can output to screen, printer, or disk. Report includes system date, page number, and optionally, record number. Paper width and length can be specified.	No	No	No	Yes; query or selection for report can be made on algebraic conditions coupled with and/or.	Adequate

					Procedural Language
Other	Report Formatter/ Generator	Screen Dumps	Other	Built-in Applications or Examples	
—	Yes	No, but listings default to screen format.	—	Demo disk comes with package.	No
—	Yes	Yes	Mailing labels—up to (255/width of label) across page. May access information from 4 other forms while generating report.	Yes	No
—	Yes. Only 12 label formats per form permitted.	No	—	Yes	No
By key or without key.	Yes	Yes	—	No	No
—	Yes, single or multiple records down and across the page.	No	—	No	No
—	Column specifications can be assigned.	Yes	—	No	No
—	Report generator/formatter not easy to use, but you can get multi-line record reports out.	No	—	Yes	Non-procedural language is best used procedurally but difficult to get used to at first.
Search by range, string, and/or partial string.	Automatic	No	—	Yes; 1	No
Search by key or by non-key fields.	Line/column oriented	Yes	—	No	No
—	Yes	Reports generated on screen and to printer.	Merging, copying, reconfiguring, deleting, creating and changing between databases.	Sample data disk	No
—	Yes	Yes	Mailing labels, up to 10 across page.	No	No

Performance Measurements

Time to Enter Standard Info	Time to Execute Standard Task	Time to Perform Sort	Time to Extract Random Records	Size of Database Created	
				Number of records in employee file	Space compression
30 minutes	Had to use report generator 1 minute to set up inquiry, 45-75 seconds to produce output. Could not do standard task with query facility—can only search based on index value.	15 seconds to read 25 records, 30 seconds to sort them.	2 seconds (very slight variation depending on size of file).	25	No
40 minutes (typed at keyboard)	25 record file: query by name = 1 second average, query by number = 1 second average, query by department = 1 second average	1 minute	1 second on average	25	Yes
6 minutes	6 minutes, plus 5 minutes to build index.	Sorts available only through report function.	9 seconds to find first last name.	500	No
1.5 hours	27 seconds	54 seconds	1.5 seconds on average	25	No
Less than 5 minutes	2 minutes. Some modules take up to 13 seconds to load. Task execution is usually one to four prompts away.	For 265 records: 47 seconds to sort on key, 55 seconds for 3-field sort.	For 265 records: 17 seconds for extracting on key, 16 seconds for extracting sorted records.	265	No
20 minutes	65 minutes	5 seconds	3.6 seconds on average	25	No
45 minutes	3 to 5 seconds	5 seconds	3 to 5 seconds	25	Available
8 minutes	8 minutes	1 minute, 18 seconds	26 seconds on average	490	No
15 minutes by import	40 minutes	10 seconds	1 second on average	25	No
As fast as you can type. Usually two prompts away.	Immediate	500 record/2 level disk sort = 28 minutes 20 seconds; 500 record/2 passes/in memory sort = 64 seconds; 500 record/1 pass/in memory sort = 39 seconds.	Depends on search option used, but within seconds.	25 records, entered manually; 500 records, imported.	No
25 records = 5 minutes (imported). 500 records = 7 minutes (imported).	25 record file = 1 second average. 500 record file = 3 second average.	25 records = 10 seconds. 500 records = 55 seconds.	25 record file = 1 second average. 500 record file = 3 second average.	25-record and 500-record databases.	No

					Hardware
Variable length of fields	Number & Size of Ancillary Files	Degradation with Additional Indexes	Time to Create a Standard Report to Screen	Time to Execute a Standard Report to Screen	Minimum Configuration Required
No	2 ancillary files: 2,560 bytes and 6,656 bytes.	—	5 minutes	3 minutes, included typing ahead to get rid of pause prompts.	128K (DOS 1.x), 192K (DOS 2.x), 2 drives or hard disk.
Yes	Three ancillary files totaling 6K.	None detectable.	45 minutes	20 minutes	128K, 2 drives
No	Index: 12,288 bytes. Screen: 512 bytes. Report format: 128 bytes. Dictionary: 512 bytes.	None detectable.	5 minutes	With 2-level sort, took 4 minutes, 16 seconds.	128K for DOS 1.x, 192K for DOS 2.x, 2 drives (one must have at least 320K capacity), monochrome or color display, parallel or serial printers.
No	4 ancillary files for a total of 5.7K.	—	1 hour	27.6 seconds	128K (DOS 2.0), 64K (DOS 1.1), 1 disk drive
No	5 files = 3,836 bytes.	—	Even when using a filter, viewed first screen of a report within 3 minutes.	At most, two menus away.	64K, 2 drives. DOS 1.1, monitor, BASIC
No	5 ancillary files for a total of 1.68 K.	—	15 minutes	15.7 seconds	128K (DOS 2.0), 64K (DOS 1.1), 1 drive.
No	2 ancillary files, at 545 and 1024 bytes.	—	1 to 2 seconds, once you get the hang of it.	36 seconds	256K, 2 drives.
No	2 ancillary files of 640 bytes each.	—	No reformatting required for standard task.	23 minutes	1 drive, 64K, monochrome or color monitor, DOS 1.x or 2.x.
No	2 ancillary files of 128 bytes and .5K.	—	15 minutes	33 seconds	128K (DOS 2.0), 64K (DOS 1.1), 1 drive.
No	5 files = 2,944 bytes. Import file = 77,952 bytes.	—	Several minutes	Several minutes	PC, XT or Compaq, 128K (DOS 1.1), 192K (DOS 2.0), 2 drives.
No	25 record file—4 indexes, 450 bytes each. 500 record file—4 indexes, usually 9,500 bytes.	—	15 minutes	25 record file = 10 minutes. 500 record file = 10 minutes.	128K, 2 drives

Software	Subjective Evaluations				
Configuration Used in Testing	Documentation	Program Robustness	Flexibility/Ease of Use	Would You Buy This One?	Would You Accept It as a Gift?
640K XT 2 drives (192K available to programs)	Just right amount, accurate. Page referrals confusing (referred to chapters that were not labeled on pages).	Excellent—crashed only on import problems, and went to DOS in an orderly way when diskette problems occurred.	Easy, quite flexible.	No, functionality hopelessly inadequate for product of this price.	Yes—is good for what it does.
128K, 2 drives	Coarse	Comprehensive, but unwieldy at times.	Fair	Not PEARL—too complicated.	No
IBM PC with 192K, 2 drives, DOS 1.1, monochrome adapter and monitor, Epson MX-100 printer	Has screen photos, sample files, and index, but no reference section separate from tutorial.	Sound—but occasionally skipped title screen and did not allow change of time or date.	Good on screen prompts and use of function keys. Must swap disks to run a report.	No. For this price could buy a much more powerful system.	Possibly; it has two methods to exchange data, which would make it valuable adjunct to Lotus' 1-2-3 and other standard programs.
256K, 2 drives, DOS 2.0, 256K micro faser printer buffer	Good	Poor	Poor	No	No
256K, 2 320K drives, monochrome, DOS 1.1	Easily understood, includes error message section, screen shots, a type your own tutorial, and a BASIC connection system.	No hang-up time, one crash when updating a record, but no data lost.	It's a snap.	I'd buy it for the home or a small business.	Should be the first file managing system a PC owner buys.
256K, dual floppy, DOS 2.0 with 256K microfaser printer buffer	Good	Good	Good	No	No
256K, 2 drives	Difficult—tutorials were good, but didn't go far enough. Reference manual was difficult to find things in, and explanations were highly technical.	Good	Flexible, but difficult to use. NPL prompts and some commands are same as those of PC-DOS, which is confusing.	No—you can do the same thing in a straight programming language for less money and get better performance.	Yes—its power is tempting.
IBM PC with 192K, 2 drives, DOS 2.0, monochrome adapter and monitor, Epson MX-100 printer	Fair	Poor. Program froze while following instructions during sort. Poorly designed error prompts. Excessive use of flashing warnings.	Operation is clumsy, menu command flow and function key assignments are not intuitive.	No. Poor price/performance ratio.	No. Too limited in capabilities, and not easy enough to use to justify limitations.
256K, 2 drives, DOS 2.0 with microfaser printer buffer (256K)	Good	Good	Good	Yes	Yes
PC, DOS 2.0, 256K, monochrome monitor, 2 drives	Looks sparse, but it does the job.	Very good. Never crashed despite occasional pushing of wrong buttons.	Data cannot be easily moved around, owing to lack of file specification.	Yes, if I were in the habit of paying \$300 for a program, if only so I could interface with other programs.	Would probably choose higher-level database program. But this one is quite good.
128K, 2 drives	Superior—computer messages are color coded so that they stand out from other text in manual.	Good	Good overall	Likely candidate	Yes

(FAST FACTS continued)

When entering characters from the keyboard, you can highlight your form with descriptions and labels apart from the field names. By prefacing characters with the F1 key, you specify that they are field names and should be used as input prompts. Finally, you can enhance your text entries with a double underline or enclose field descriptions and/or text in a double-ruled box. You do this by specifying the upper left-hand and lower right-hand corners; the program draws the box for you. Should you care to segregate your entry screen into personal, salary, and departmental information, for instance, this method is visually effective. Of course, the text, borders, field names, and data are highlighted even more dramatically if you own a color monitor.

FAST FACTS gives no length specification for data within a given field. The entry area is defined as beginning one space after the field name ends, and it continues until it comes upon the first character in another field name or a text or graphic character.

Entering the information can be a little tricky. You can travel from field to field within the record by typing the data and pressing the Return key. If you just want to jump around, you can use the Home and End keys to move between fields.

The cursor keys permit you to physically enter text anywhere on the screen—but it's only saved if the entered material is in a field. At one point, a combination of cursor keys, text characters, and delete commands locked up the keyboard and caused a doleful bell to ring. A warm reboot was the only solution.

FAST FACTS carries out the second part of operating a database, retrieving, with unexpected speed. Moving from one record to another in index order, using a test file of 25 records, takes less than a second. Overall retrieval rates using single-level nonindexed criteria averaged 4 seconds. The longest time *FAST FACTS* took was when it could not possibly make a match. It took almost 12 seconds for the program to search the file completely.

A Glossary of Database Terminology

These definitions will help you find your way through the jargon you'll encounter when you use database management programs.

ad hoc query: A request for information made to a database system that was not specifically planned for and preprogrammed into the system. Many database programs for the PC will let you ask such questions as "what is the sum of the expenses for all transactions in June?" Unfortunately, most require that you formulate it in a more structured and precise way (such as SUM EXPENSES FOR MONTH = "JUNE").

append: To add new records to a database.

ascending: The order that ranges from smallest to largest or first to last. For many database systems, the only order you can have the data sorted in is ascending, but a few will also allow descending or user-specified orders.

attribute: Applied to fields in databases, indicates what kind of data can be stored there, and how it will be treated. For example, the field might be designated as numeric with two decimal places, or as alphabetic and automatically capitalized. Some programs call this the "data type."

When applied to the data itself, it is an aspect of the data that will be entered into a single field. For example, one attribute for a person in a personnel database would be his job title.

audit trail: A report or file generated by a DBMS that records transactions that add to, change, or delete from the database. Pre- or post-imaging audit trails capture the contents before and after the change, while transaction-oriented audit trails record the actual transactions entered by the user.


B-tree: Short for balanced tree, a way of organizing the pointers to information in databases that allows quick retrieval of any single specified record. So-called B+ or B* trees allow records to be efficiently retrieved in sequential order as well as individually by specified record.

binary search: A method of searching a file or table by successively dividing a list in half until the desired value is matched or found to be missing from the list. Binary searches are often the best method when the list to be searched is known to be in order and relatively uniform. Many database systems use this method for locating items in their indexes.

(continued)

This unexpected delay carried over when I increased the file size to 500 records. A no-match search done on the indexed field took 3.5 minutes. (It took 23 minutes for *FAST FACTS* to read the 500 pieces of data into the database from a standard ASCII file.) Unfortunately, while some programs hit their strides in this medium-sized record number range, *FAST FACTS* doesn't quite come up to speed.

The program's report generator is somewhat of a surprise—it is fast. Printing 25 records took only 16 seconds. But it's also limited. You can do a mailing list, but the other two reports are both row-oriented. The quick report is a dump of your file, in 20-character-wide fields



The quick report is just a dump of your file, in 20-character-wide fields strung across the page until you run out of paper width.

strung across the page until you run out of paper width. The standard report (called a library member, for some reason) allows you to select the fields you want printed and even choose whether the information will be right- or left-justified. You can do all of the usual breaks and additions, but the program still only prints data across the page.

It's a shame for a program to have PC-specific features such as the function key support, the graphics, and the color and still have a flat taste because its reports aren't all they could be. *FAST FACTS* appears as if someone took the precepts behind PFS Software's *PFS:FILE* and *PFS:REPORT*, tried to improve them, and succeeded only in making them more complicated. —Bill O'Brien

CODASYL: An acronym (pronounced code-a-sill) for Conference on Data Systems and Languages, a federally sponsored industry committee that developed standards which led to the COBOL language and many of the more complex types of databases.

collation sequence: The order that the computer will use when it arranges items from first to last. Typically, this order is alphabetical for words and numerical for numbers. However, the question becomes complex when you have to take into account uppercase and lowercase, mixed numbers and words, punctuation, numbers that are not filled to the same length with leading zeros and other factors. Every database should specify the collation sequence it uses, and whether you can substitute your own.

data: In the context of computer databases, information in a form that can be stored or manipulated by a computer.

database: Most generally, any clearly identified collection of data. Some people differentiate between a data base (two words), meaning an underlying collection of data in the real world, and a database (single word) as a coherent collection of data entered into a computer system. As applied to data in the computer, it particularly means data organized so that various programs can access and update the information.

database management system: A program or set of programs that provides a framework for creating, editing, and maintaining collections of data for use by different programs. It serves as the interface between the programs and the data. The database management system (DBMS) may also include a query facility for making individual requests for information from the database, and a reporting facility for producing formatted listing of selected data.

data dictionary: A list of all the files, fields, and variables used in a database management system. A data dictionary helps you remember what items you have to work with and how you've defined them. Using one is particularly helpful when you're writing a large number of linked procedures or programs that share a database.

DBMS: The common abbreviation for database management system, explained above.

descending (sort or index): The order ranging from largest to smallest or last to first. Some database systems for the PC allow you to specify descending order in certain fields, but many will allow only the more common ascending order.

direct: The method of accessing data on a disk or in memory by looking up a key value in an index and then using the associated pointer to find

NPL: Not on the Menu

NPL (NONPROCEDURAL LANGUAGE) will prove quite a shock to anyone used to today's menu-driven, single-file database managers. Even a crusty old programmer like me had difficulty getting used to issuing commands (with proper syntax and grammar, no less) to create a simple file and to enter, sort, and report data.

NPL's commands are touted by its manufacturer, DeskTop Software, as being "natural language" commands, but they're about as "natural" as the PC's Macro Assembler is. NPL's commands appear to be a hodgepodge of verbs and phrases inherited from various pieces of software such as FOCUS and RAMIS.

NPL

DeskTop Software, Inc.
228 Alexander St.
Princeton, NJ 08540
(609) 924-7111

List Price: \$500

Description: Nonprocedural language interface.

Requires: 256K RAM, two disk drives.

Records per File: 3,600 at 100 bytes per record.

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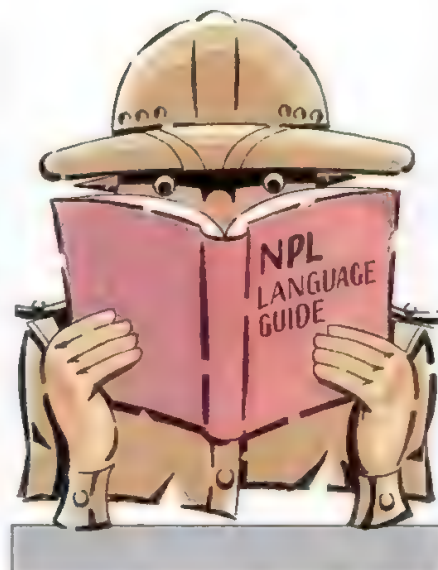
CMS and PC-DOS, and then flavored with a heavy dose of FORTRAN.

Perhaps the only natural-sounding command used in NPL is CREATE (used for file definition). After that, you will have to learn that DEFINE is used to change the file definition, MODIFY is used to enter data, and MODIFY with RUN means query and update the data. PRINT seems natural enough, but you must remember to WRITE if you want totals, counts, maximums, minimums, and other statistics and calculations.

Also confusing is that NPL's C> prompt makes NPL look like PC-DOS (and, for that matter, FOCUS or CMS). It's easy to find yourself completely lost. To make matters worse, some of NPL's commands, such as DIR and TYPE, also have a familiar ring to them.

The good news is that, once you get used to it, NPL is extremely powerful, and would probably be easy to use if you worked with it every day. It's unfortunate that the power of NPL's commands is not applied to something more sophisticated than a single-file sequential database management system.

NPL's power does include the ability to make life easier to use for those who can't



NPL's commands appear to be a hodgepodge of verbs and phrases inherited from various pieces of software.

(or don't want to) remember all of its commands. NPL allows you to create procedures (programs), which include custom menus and screens.

Did I say procedures? Doesn't NPL stand for NonProcedural Language? NPL's authors have learned their history lessons well and recognized that the first failing most users see in nonprocedural systems is their lack of procedures. So they've given NPL the ability to use procedures called EXEC.

Unfortunately, NPL has no inherent ability to create EXEC. You can try out your procedure in NPL command mode, but you can't save it if it's successful, and, I promise you, it will take you several tries to get it right. To create and modify an NPL EXEC you have to resort to your favorite editor. (NPL's tutorial does include a pretty good little piece on how to

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Data Processing	25800.00	Champaign	IL	60605	
		404904 Accounting			15500.00
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		410 Market St			
		Shreveport	LA	71101	
		194067 Data Processing			25800.00
		Alice Horton			
		8 Daniels Place, NE			
		Cedar Rapids	IA	52402	
		303039 Data Processing			27500.00
		Rae Ann Howard			
		845 Richland Ln			
		Herndon	VA	22071	
		304583 Data Processing			29200.00
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*Requirements: MS-DOS, 192K RAM, two disk drives (minimum 320K each). Runs on IBM PC and IBM XT (and most compatible machines), TI PC, NEC APC, DEC Rainbow, Zenith Z-100, Victor 9000, Tandy 2000 and the HP-150.

CIRCLE 237 ON READER SERVICE CARD

use the much-maligned Edlin editor to make a simple screen EXEC.)

An added attraction of *NPL* procedures is that you can create data entry, modification, and reporting scripts that include friendlier prompting and field editing. Screens can be designed to make some of the data fields inaccessible. Once again, it's a shame that this power isn't applied to a more sophisticated data management system.

Did I say *NPL* couldn't create and edit an EXEC? Let me back up a bit. *NPL* has difficulty editing in its own file CREATE facility. The program was quite content to accept my first crack at creating the PC test file, but when I tried to use it for entering data, I was told (most impolitely) that its format was hopeless by *NPL*'s standards, and could not be used.

NPL does offer the DEFINE command to modify the record structure. Unfortunately, it proved so difficult to use that I gave up and started creating the file all over again. It passed inspection the second time, and I thought all would be well.

Not quite. I had made another mistake. *NPL* doesn't bother to remind you that filled integer fields over five digits long will not print out correctly. By the time I found this out, I had already laboriously

NPL doesn't bother to remind you that filled integer fields over five digits long will not print out correctly.

typed in all my data. However, I figured out that some types of file modifications could be made by using a typical editor, so I zapped the problem with the IBM Personal Editor.

Data editing isn't too swift, either. You can specify edit criteria, but I didn't

where to read or write the requested data. This method is quicker than sequential access (where each record in the file is read or written in turn).

edit: In database terminology, to change an existing record. Adding new records is called "appending" or simply "adding."

edit (second definition): To check data entered in a field for conformity with a predetermined set of rules. For example, characters, numeric, capital letters, numbers within a range.

export: For a database system, to write the data out (usually to a disk file) in a form that other programs can use. Many database programs store their data in some coded form, but will produce for export ASCII files that can be read and edited with a normal text editor.

field: An area for recording a single item of data in a database or other data-recording program. A field may hold a number, a name, a yes-no answer, a date, or even a page of text. Conceptually, it's equivalent to a single fill-in-the-blank line or box on a paper form.

file: A collection of data that PC-DOS (or another operating system) treats as a single unit when it shows the directory or for system level commands (such as "TYPE" or "DELETE"). Internally to the database, the file is considered a collection of records, which in turn are made up of fields. Some databases can work with multiple files, but others use only one data file at a time.

file manager: A simple database management program that uses only simple files and indexes.

hierarchical: A model for organizing data in a database where the basic conceptual unit is "ownership." Each item "belongs" to a higher item and is accessed through that higher item. This model is used on CODASYL and network-type databases on large computers, but on only a few programs that run on the PC.

import: To read a file created by another program into a database system. Many databases for the IBM PC can import from files created by BASIC, or in the DIF form used by *VisiCalc* and other spreadsheet programs. In the UNIX world, this same process is often called "to pipe in."

index: As a noun, a set of pointers that connect logical values with the location where the applicable data is stored. In some database programs for the PC, you can have only one index per database. Others allow you to have several. The index functions much as a card catalog in a library. If you want records on a certain topic, looking up the topic in the index and then going directly to the correct location on the shelf is much faster than combing through all the books.

As a verb, to *index* means to construct an index file, either for an existing set of records or for data as it is entered into the database.

ISAM: An acronym (pronounced eye-sam) for indexed sequential access method. This method of organizing data was pioneered by IBM when magnetic tape was the principal means of storing data and is little used on databases that you're likely to find on a PC. In effect, it keeps the data basically in order, making an exception list of out-of-order items as data is added, deleted, or changed. Periodically, the file must be cleaned and rewritten to eliminate the exception list.

Join: In general, to combine two databases (or as a noun, the result of that combination). In particular, as applied to relational databases, to make a new file containing all records in a second file that are referred to by a first file. For example, to make a shipping list file by joining the orders file with the inventory file. Joining often takes quite a lot of disk activity and is likely to be slow on PCs without hard disks.

key: The part of a record that will be used as the identifier when the records are indexed or sorted. For example, in the telephone book, the key is each subscriber's name. In a database, it's often order or transaction number, date, a name, or a part number.

Some databases for the PC allow you to have duplicate keys (where the key data is the same for two or more records), but others require that each key be unique.

locking: The process of temporarily shutting out other users in a multi-user system while a transaction updating the file is completely processed. Locking may be done at the individual record level ("record locking") or at the file level ("file locking"). Locking is necessary so users don't interfere with one another or access data that has been partially updated.

lookup: To access a table or list. A common example is converting state abbreviations into the full name of the state. The list or table may be a separate file on disk, a series of statements in a procedural language, or a table or relation within a database.

mask: A pattern used for checking data entered into a database to make sure it has the right form for entries in that field. For example, a mask might specify three digits for an area code, or two letters for a state abbreviation. See edit.

The term is also used to denote a pattern that is used for searches, such as one indicating all names starting with "A."

natural language: An English-like syntax that closely follows everyday speech or sentence structure, most commonly used for ad-hoc query or report generation. Most such languages are extendable, with the ability to define new terms in the context of those already understood by the DBMS.

advance far enough to try it and had to be content to let *NPL* remind me that I shouldn't enter alphabetic characters into numeric fields. I was disappointed to discover that the only user edit key that works is the (erasing) Backspace key. A left arrow will insert a *K*, and a right arrow

NPL's obscure prompts make it almost impossible to figure out if your attempt to change a field has been successful.

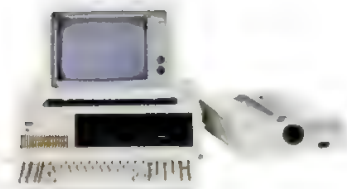
will insert an *M* into your data field. The Del and Ins keys work (or don't work) similarly. To make matters worse, if you try to go back to a field to change it, the first key you type will wipe out the entire entry.

Modifying a previously entered field is also difficult at best. It is difficult to get to the record you want to modify, the *NPL's* obscure prompts make it almost impossible to figure out if your attempt to change a field has been successful (it usually hasn't been).

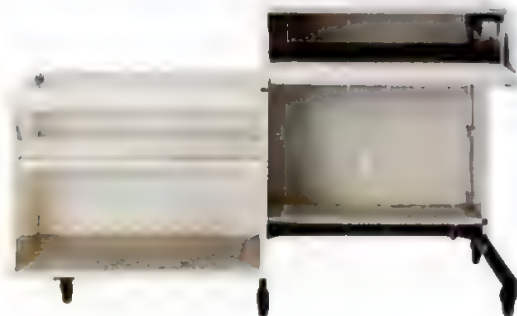
I dislike auto-entry in other systems; in *NPL* I absolutely hate it. Every time you fill a field's width, *NPL* beeps the PC's plaintive horn as it moves on to the next one. The beeping also makes the cursor's movement to the next field take twice as long as when you just press Enter (when you are lucky enough to not fill a field). I ended up wearing the construction earmuffs I keep around for when the daisy wheel printer is running so I wouldn't have to listen to the thing.

The report generator works well enough, and sorts and selections are easy to specify once you get the hang of *NPL's* syntax and uninformative error messages.

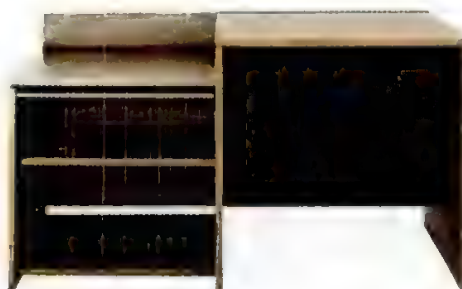
One good idea



deserves another



and another



and

another.



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The IBM logo, consisting of the letters "IBM" in a bold, sans-serif font.

I kept forgetting to end the PRINT command with a period, which results in a curt R> continuation prompt. Worse, if I forgot to specify items in an involved sorted report, NPL proudly announced that it was sorting (which takes quite a while), and then proceeded to print absolutely nothing—without an error message in sight.

NPL's report generator is not too friendly about mundane things, either. For example, it told me that report lines would be 146 characters long and proceeded to print it without giving me a chance to stop long enough to figure out how to shorten

If you think menus are only for restaurants, NPL might be your cup of tea.

the lines. Well, I guess *real* database management systems are for *real* users who don't make stupid mistakes.

It took me a while to slog through NPL's technical manual (its authors are convinced that the world will beat a path to the door of PC users who understand packed binary formats for floating-point numbers) to find out how to use the OVER option that makes new lines in a report.

With all this sophistication and complexity, you'd think NPL would be a sterling performer. It isn't. Many simpler-to-use menu systems outperform NPL at searching, sorting, and modifying data, and every other product I tried helped me get my application up and running faster.

If you think menus are only for restaurants, NPL might be your cup of tea. But I think you deserve a more powerful data management system to go along with NPL's language and sophistication. For \$500, you ought to get something to write home about!

Now, where did I leave my mouse?

—John Dickinson

Magictable: Weak Magic

MAGICTABLE IS DESIGNED around a table of rows and columns. Each record is a row whose fields are organized by column. This format is the basis for most of the operations and displays in *Magictable*.

To use the program, you start by defining fields on a "frame". Each field is

assigned a column name and a field type (either text, number, or computed). Text fields may be up to 62 characters long, and numeric and computed fields may contain 10 digits (including the decimal point). You must specify the size for each field, and the calculation for any computed fields. *Magictable* generates a data dic-

*** The magic table mstaff on drive B ***

	First Name	Last Name	Address	City
1	Stefano	Pilbeare	4000 Parson's Pond Dr.	Franklin Lakes
2	Boone	Pilbeare	P.O. Box 1328	Boca Raton
3	David	Banning	P.O. Box 2909	Delray Beach
4	Maggie	Horton	900 Kiss St.	Rye Brook
5	Julie	Williams	P.O. Box 10	Princeton
6	Long	Williams	P.O. Box 57165	Washington
7	Engene	Bradford	2575 E. Bayshore Rd.	Palo Alto
8	Alex	Marshall	7 Oak Park Dr.	Bedford
9	Tom	Horton	P.O. Box 968	Fremont
10	Alice	Horton	Box 399	Newmarket
11	Tony	Pilbeare	2260 Towngate Rd.	Westlake Vill
12	Bona	Brady	P.O. Box 3755	So. Bend
13	Marlena	Evans	24 Spinnaker Pl.	Redwood City

(right column partially displayed)

Please use function key to display and modify the magic table:

(F1) left	(F2) right	(F3) first	(F4) last
(F5) previous	(F6) next	(F7) summary	(F8) record display
(F9) insert rows	(F10) delete rows	(F11) return to insert data diskette	(F12) invoke function menu

*** The magic table mstaff on drive B ***

	City	State	Zip	Emp No	Department	Salary	Hi
1	Franklin Lakes	NJ	07417	120390	Accounting	31200.00	PS
2	Boca Raton	FL	33432	120460	Data Processing	17600.00	PS
3	Delray Beach	FL	33444	120530	Marketing	15700.00	PS
4	Rye Brook	NY	10571	120600	Production	22300.00	PS
5	Princeton	NJ	08540	120670	Shipping	19400.00	PS
6	Washington	DC	20017	120740	Accounting	12000.00	PS
7	Palo Alto	CA	94303	120810	Data Processing	15300.00	PS
8	Bedford	MA	01710	120880	Marketing	21900.00	PS
9	Fremont	CA	94537	120950	Production	21000.00	PS
10	Newmarket	MA	02157	121020	Shipping	21050.00	PS
11	Westlake Village	CA	91361	121090	Accounting	10000.00	PS
12	So. Bend	IN	46619	121160	Data Processing	11200.00	PS
13	Redwood City	CA	94065	121230	Marketing	20000.00	PS

(right column partially displayed)

Please use function key to display and modify the magic table:

(F1) left	(F2) right	(F3) first	(F4) last
(F5) previous	(F6) next	(F7) summary	(F8) record display
(F9) insert rows	(F10) delete rows	(F11) return to insert data diskette	(F12) invoke function menu

The left half (upper screen) and right half (lower screen) of a *Magictable* report.

Magictable

Presta Digital
10 Bridge St.
P.O. Box 7192
Lowell, MA 01852
(617) 458-4070

List Price: \$159

Description: Relational, handles only one file at a time.

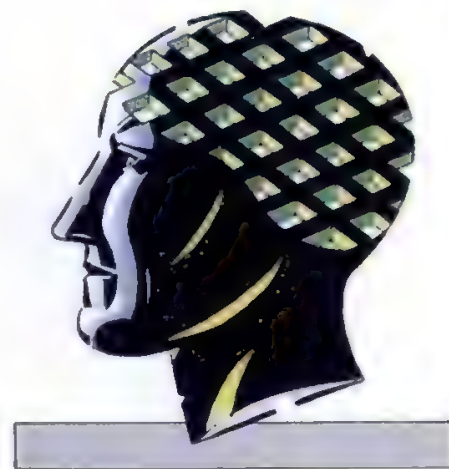
Requires: 64K RAM, one disk drive.

Records per File: About 3,000 per disk.

CIRCLE 732 ON READER SERVICE CARD

tionary based on these definitions, which must be done before data is added to a file. You may add new fields, but must then reorganize the data by copying it to new files. You may also make notes on any field in a "comments" section.

Magictable displays data in table format, although it is possible to obtain individual records in a "vertical" format that lists each field on one line. When you search the file for records meeting certain criteria, *Magictable* will display all



records that qualify on a table display. If you have more records than will fit on one screen, you may page through the screens to view the rest of the selected records.

Magictable structures the data files as one long string of fixed-length fields, with no delimiters for the individual records. You can use SDF format as the source for a *Magictable* file, but you must make certain that the frame is set up with the correct

network: A way of structuring databases that allows more than one link to other records both to and from each record. An extension of hierarchical organization (see above). Records in a network can both own and be owned by another record.

nonprocedural language: A method of telling a database system what type or range of data you are looking for rather than how to find it. For example, on some systems you fill out a screen showing a blank record with ranges of values you want for selected fields. Some people prefer this method, especially for ad hoc (unplanned) queries.

pack: Most commonly, to rearrange a file to eliminate the space formerly occupied by deleted records. The term is also used to refer to storing data in a format that eliminates multiple blanks and leading zeros.

pointer: A number that tells where some item of data is located. Most databases for the PC use an indexed system to keep track of where data is stored on the disk drive. In these systems, you request a data record by asking for it by a "key." The system then searches a table for the key and then reads the associated pointer to find where on the disk the applicable record is stored.

procedural language: A syntax within which programs or procedures can be written, causing the DBMS to process records, display information, perform calculations, or otherwise manipulate data. A programming language. See natural language.

protected: In reference to a video display, parts of the display that are meant as guides for filling in information and set so they can't be overwritten or erased during the data entry process. For example, in an address file, the legend "NAME:" might be protected, showing you where to fill in the current person's name.

On the PC, protected fields are often shown in other colors or as dimmed, highlighted, or reverse video.

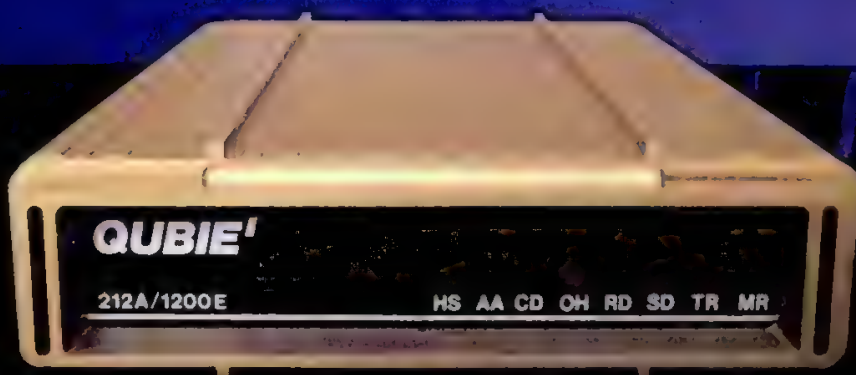
query: To make a request for information from a database system (or as a noun the request itself). Some systems let you make ad hoc queries (see above), but others restrict you to the more structured report process.

query by example: To ask for information from a database system by defining the qualifications for selected records on a sample record, rather than describing a procedure for finding the information. This nonprocedural method is available on several databases for the PC, including the popular *PFS:FILE*.

random access: Another term for "direct access" (defined above). The "random" part does not mean chaotic, but rather than items can be retrieved in orders other than purely sequential.

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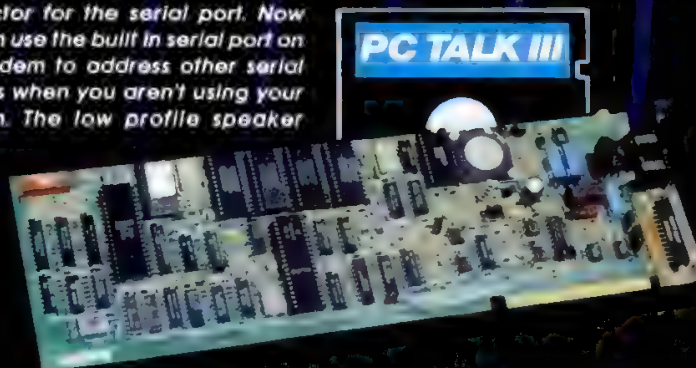
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number of spaces for each field and that you create a two-space "dummy" field at the end of the row to hold the carriage return and line feed codes that are used in the SDF format to separate records.

The program's search criteria are surprisingly versatile. You may search for an absolute string (a one-to-one match with all characters in a given field) or for a combination of absolute strings. For example, you may search for the month July. You may also search for "June,July,August"; any record containing one of those strings will be displayed. You may search for contained strings, ranges, or logical relations based on constants or field contents. You may not, however, search for strings beginning with a particular character.

If the total length of the fields is too long to fit on one screen, *Magictable* partially displays the last field that fits and gives an appropriate prompt at the bottom of the screen. Press a function key, and the next batch of fields is displayed, starting with the one that was divided on the previous screen.

One problem with *Magictable* is that its reports are based on the screen display. This design means that any field that does not fit within the width of the report page (either 80 or 132 columns) will be divided and each page will include the statement "table too wide, columns partially printed." There is no way to get a record to wrap around to the next line, and thus you are forced to print a large table in two parts. The result is unwieldy and not attractive enough to be acceptable for any but the most informal uses.

Magictable does have a limited ability to create form letters. As demonstrated in the manual, you create a dummy table with variables defined and then merge it with the data file. *Magictable* lets you create mailing labels, form letters, invoices, statements, and other form-oriented reports. One drawback of the program is its awkward choice of keys and symbols for indicating carriage returns, line feeds, tabs, and form feeds in the form table.

You must boot *Magictable* from the

record: The collection of fields or items about a single person, item or transaction in a database that is treated as a unit when the database is sorted or reordered. In the analogy of a filing cabinet, a record is a single folder, made up of one or more pages each with several fields full of information.

relational database: A database in which multiple tables can be associated or related to one another based on common data items or fields within the tables. Compare with hierarchical and network. See join. For example, a name and address file might have columns for name, street, city, state, zip, and telephone number. You'd then create a record for each person by filling in each field starting with their name.

report: An on-screen display or printed listing showing selected information extracted from a database (and as a verb, the act of generating this listing). Most database systems allow you to design your own reports, and some allow quite extensive formatting and mathematical processing.

screen: In reference to database programs, a formatted display for data entry, or for messages from the program or requests for further inputs. On a paper report, the equivalent is commonly called a "layout" or "page format."

select: To pick out a group of records from a database according to specifications provided by the user. For example, to select all records with the year greater than "82." Many database programs will let you specify several criteria combined with ANDs and ORs to make a more complex selection.

sequential: Information that is stored like a list, with each item following the previous one. Sequential organization is efficient for producing reports in the same order as the data, but it is hard to update or look at in other orders. As a result, most database systems use direct access methods.

set: In hierarchical systems, the path by which one record type is connected to another. Sets may be used to provide various user views of a database.

sort: To rearrange the order of records in a database system. Some of the more limited programs for the PC will allow you only to sort the record order by the one field that you previously defined as the "key." Others allow you to specify the sort field at will.

Because database programs for the PC don't yet include any knowledge of the outside world, all sorts are strictly by numeric or alphabetical order. You can't ask, for example, to have a list of foods sorted by spiciness unless you have included a value for that attribute.

Many database systems don't usually change the physical position of the data records themselves when you ask for a sort. Instead, they

sort an index or set of pointers, putting the pointers in the right order so picking the pointers in turn will access the data in the right order.

span: To allow a single logical collection to cover more than one physical storage segment. In particular, to allow a single logical record to cover more than one physical record, or to allow a single logical file to cover more than a single disk.

table: A collection of records, viewed in the form of a series of rows and columns. The individual fields make up the columns, while each record is considered a row.

type: The form that characterizes data. Common data types are: character, numeric, and logical.

update: To change information in a database, or to fill in information in an existing record. In most databases, you can update one file with information from another as well as updating a single record at a time.

view: A way of presenting the contents of a database to the user, not necessarily the same as the way the fields and records are stored in the database. Different users or programs that call upon the database for information may have unique views of the data.

Steve Rosenthal will publish additional glossary material with Prentice-Hall.

and a potential source for confusion for the technically unsophisticated user. An alphabetic listing would work just as well, and the extra ten spaces could be used for on-screen explanation. The program has no Help function.

The greatest shortcoming of the package is its documentation. Although it is attractively laid out and typeset, the manual's content falls short of the mark. The writing style is generally good, but the examples are not always clear. The section entitled "Tutorial" shows you how to

There is no way to get a record to wrap around to the next line, and you are forced to print a large table in two parts.

default drive. This may be a problem for hard disk users who use the hard disk as the default drive, since the program disks are copy protected and cannot be copied to the default drive.

The program does have some flaws. Running on a floppy disk system with 128K under DOS 2.0, I tried to sort a standard set of data composed of 500 records. *Magictable* responded with a prompt saying that the computer's memory limitations meant only 493 records could be sorted. I simply deleted the last seven records to bring the table down to 493 rows. When I tried sorting again, I was again told that only 493 records could be sorted. Figuring that the program perhaps miscounts by one, I deleted one more record, and then tried a two-level sort again.

After 6 minutes of waiting, I decided the program had gone away and was not coming back. I tried to stop the sort, but

the keyboard was frozen. About 7 minutes after the start of the sort, I reset the computer. I then deleted two more records, and the sorts ran successfully.

Magictable's design has created other annoyances and inconveniences. Sorts are not saved, so the only way to update a sort is to copy the file to a new name. This procedure means a great deal of disk file maintenance for you because you cannot give a new table the name of an existing one. If you want to use the same name as an existing table, you must first delete that table.

Magictable's error messages all begin with a slightly peevish "Sorry," followed by an "error 020" (or some other number), and then a few brief words on the error condition. The error prompt and the offending portion of the screen flash until the error has been corrected. The error numbers are used to organize the explanations in the manual, but are unnecessary

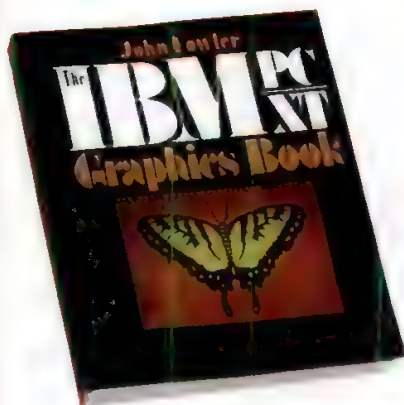
move around within an existing table, and then in the "Application Exercises" section you are shown how to create your own frame and table. To review a specific operation, however, you may have a difficult time. The manual has no index and no tab dividers to help you find the summary reference section. There is, however, a brief command summary card.

The manual's printing also leaves something to be desired. My copy had eight pages with blank backs although the page numbering indicated that there should have been something on them.

In all, *Magictable's* limitations in reporting and data transportability are too great for it to be of much significance. In its favor, I can say that you can learn to work with it, and it does display a great deal of data at one time. Its form letter capability might also be attractive to users with specific needs. —Alfred Poor

(continued)

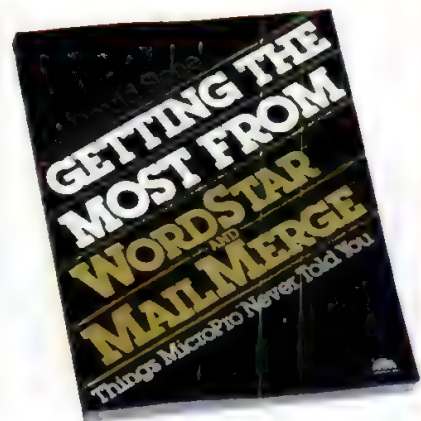
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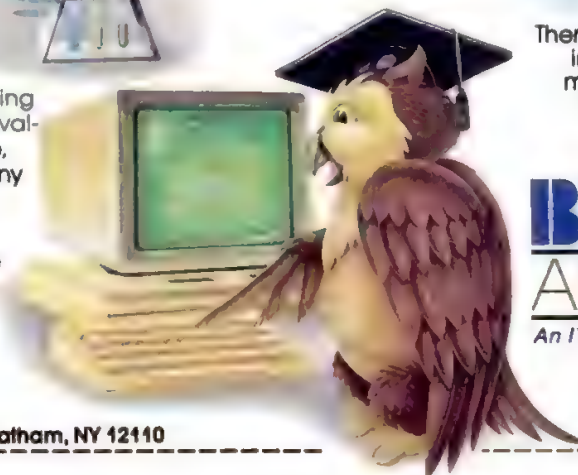
have MCI print the message on their high speed laser printer and mail it from the nearest city!



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CIRCLE 197 ON READER SERVICE CARD

PC-File III: Best Performance for Price

PC-FILE III IS A MEAT-AND-POTATOES database program with more than a few surprises. Its single disk and rough appearance belies its strengths.

PC-FILE III employs no trick questions or roundabout approaches. You tell it what drive the data should be on, and the name of the file. If the file doesn't exist, the program puts you into the Create mode. If you want to protect your system from unauthorized use, select a password and use an exclamation point as the last character in its name. Doing so will place you in a Security mode.

The program then asks you to enter the name for the key field (the one on which the data is indexed), followed by the length of the field. A maximum of 41 fields is allowed, and length can be as long as 65 characters. However, if you have a 40-column display or define more than 21 fields, the character maximum is 25.

PC-FILE III offers some special fea-

tures. If you add a number (#) sign to a name it will be treated as a number. You can also enter "reserved" words used by the program to fill in automatic dates and times. And after you've defined the file, you can even enter data. If the data you need already exists in a sequential file, you can use another program called *PC-Import*

Nonetheless, quite a few exist. For instance, the manual is a text file on the disk; you print it out yourself. Those of you with word processors might find it more helpful to go into that file and restructure it a little. Some points could have been better emphasized.

PC-FILE III does not provide screen mapping. A full-screen editor would be useful, although the request approach works well enough. Updates are released

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Data Processing	27500.00	Alice	Horton	8 Daniels Place, NE	Cedar Rapids	IA	52402
Data Processing	29200.00	Rae Ann	Howard	845 Richland Ln	Herndon	VA	22071
				304583			

A PC-FILE III report.

to transport it to PC-FILE.

You can alter the information in any single field, including the field names. If you do change a field name, all references to it are changed in any associated reports. This feature alone might well be worth the price of the program. PC-FILE III also includes a partial match and "soundex," a sounds-like feature.

Reports can be defined as either linear, multiline, or mailing labels. Data can be placed on the page in a random column with row advance (rather than row specification) from the previous field. In addition to the usual headings and totals, you can have a calculated field created at print time. Also, long procedures can be redefined as a single keystroke, which reduces input time considerably.

Everything went so smoothly with PC-File III that I breezed past the rough edges.

twice yearly, and the next version may incorporate changes in the editing features.

But, PC-FILE III is not a \$300 program. It costs only \$45. On a performance/price basis, this may be the best money you'll ever spend. —Bill O'Brien

PC-FILE III

Buttonware
P.O. Box 5786
Bellevue, WA 98006
(206) 746-4296

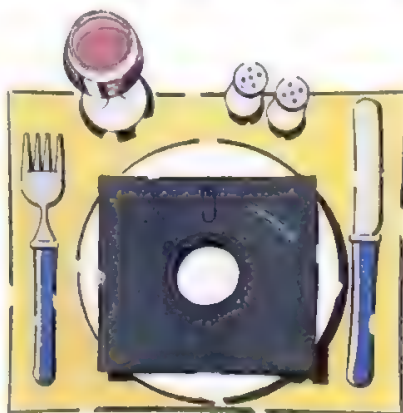
List Price: \$45

Description: file manager, freeware, fee is donation.

Requires: 128K RAM (DOS 2.0); 64K RAM (DOS 1.1); one disk drive.

Records per File: Limited only by disk size.

CIRCLE 733 ON READER SERVICE CARD



Everything went so smoothly with PC-FILE III that I breezed past the rough edges.

Database Manager II: Versatile and Easy

DATA BASE MANAGER II (DBMII) BY Alpha Software Corporation must have been developed for business people who want nothing to do with becoming computer literate and everything to do with easily running business applications. I make this point because no mention of data types is made either within the program or the manual. That in itself may not mean very much; but in the context of the program's vast number of integrating capabilities, its narrated tutorial, and a main menu that includes virtually every option conceivable, no other explanation is possible.

Is DBMII (Version 1.3) easy to use? Yes. It's so easy, in fact, that you can set up and run a database within 2 minutes of booting the disk. File specification, normally a time-consuming procedure is accomplished as fast as you can type in the field name and length. Even reconfiguring the database by inserting, deleting, or changing a field amounts to not much more than a one-step operation.

Configuring a database with DBMII consists of merely specifying the field name and length. The creation of the Input

screen is so straightforward that the Help screen displays only a single message: "help!!!!!!" This message can be disturbing, of course, especially to novice users, but the creation of the Input screen is really so simple that very little more could have been added to explain it. Once the screen is created, you enter the data through either the keyboard or the Import function.

The importing and exporting functions are DBMII's best features and are the inspiration for its subtitle, *The Integrator*. Among the programs that can be used or integrated with DBMII are: *WordStar*, *1-2-3*, *Multiplan*, *VisiCalc*, and *MailMerge*. Some files need to be imported twice before they can be inserted into a DBMII database file.

For example, *WordStar* first needs to be converted to a DEX (Data Exchange) format by choosing the tenth option on the *VisiCalc/1-2-3/WordStar* menu and supplying drive and file name information. The actual conversion process begins when the screen displays the data. At this point, the fields can be imported manually and hence selectively or automatically by using the Options feature. In the latter

case, the user must set the field delimiters to be ignored or accepted. Then, after choosing the automatic field selection and identifying the direction (vertical or horizontal) of the fields being imported, the user must decide whether the field number is to be incremented after each selection. It is also necessary to specify what field number the program should start at, for



DBMII is so easy to use that you can run a database within 2 minutes of booting the disk.

V i s i C a l c / 1 - 2 - 3 / W o r d S t a r . I M P O R T M E N U

1. 1-2-3 Worksheet --> DATA BASE MANAGER II
2. Multiplan SYLK file --> DATA BASE MANAGER II
3. dBase II DBF file --> DATA BASE MANAGER II
4. VisiCalc DIF file --> DATA BASE MANAGER II
5. MailMerge (Comma Separated Value) file --> DATA BASE MANAGER II
6. 'TABLE' ascii file --> DATA BASE MANAGER II
7. Text file / WORDSTAR document --> Data Exchange Format (DEX)
8. Data Exchange Format (DEX) --> DATA BASE MANAGER II

Enter a Selection # and Press RETURN

Data Base Manager II

Alpha Software
30 B Street
Burlington, MA 01803
(800) 451-1018

List Price: \$295

Description: File manager with some relational capabilities.

Requires: 128K RAM (DOS 1.1); 192K RAM (DOS 2.0), two disk drives.

Records per File: Based on memory limitations.

CIRCLE 734 ON READER SERVICE CARD

The Data Base Manager II Import menu.

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16 bit systems require 128K RAM.
Customer support available for nominal fee.

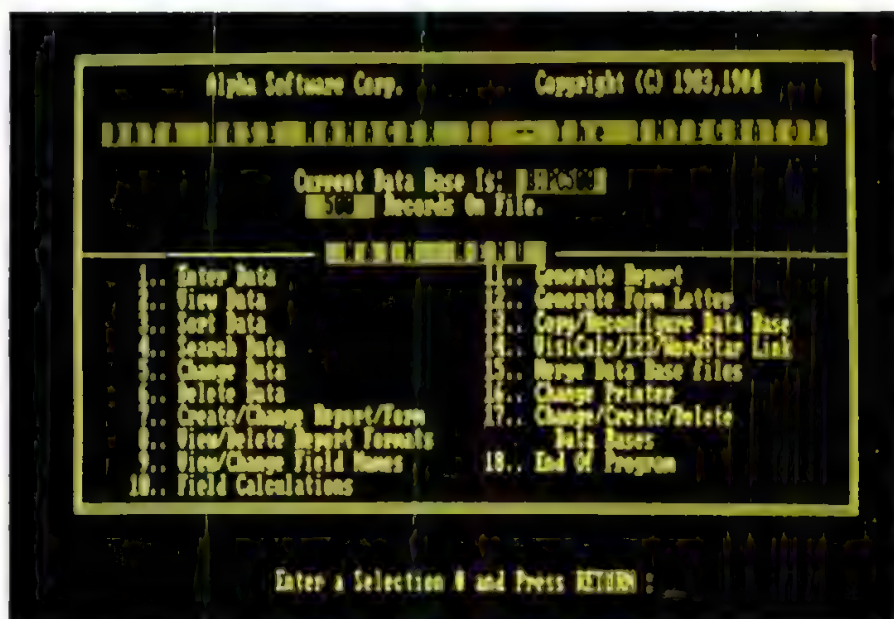
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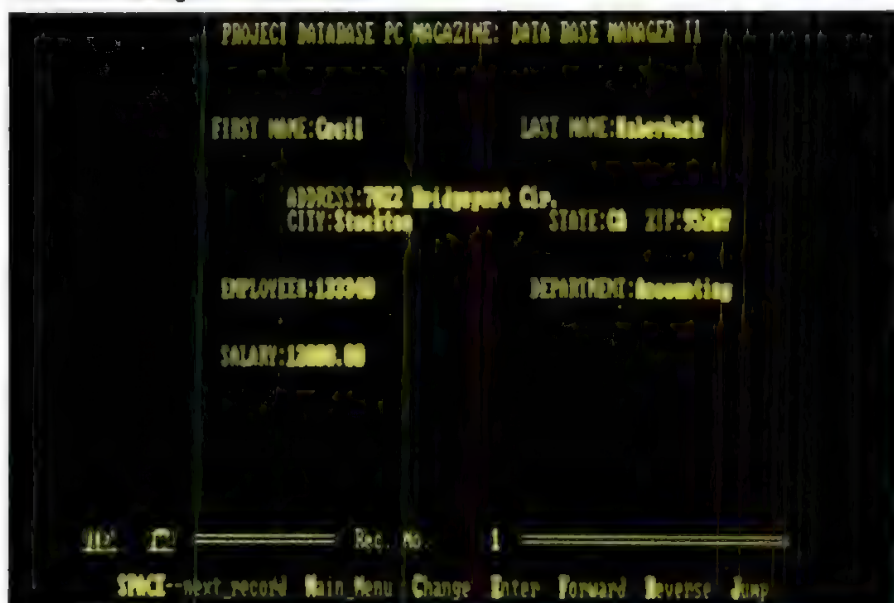
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Data Base Manager II's main menu.



A Data Base Manager II record.

how many fields, and whether they have a fixed format. The Double Quote, or Ditto ("), function appears in the final sequence of questions. This repeat feature allows any key, such as Return, to be duplicated for a user-defined number of times. The automatic process is not exceptionally fast; it took over 3 hours to convert 4,500 fields from *WordStar* to DEX.

Transferring DEX to *DBMII*, however,

is much faster and easier. After selecting option 11 on the Import menu, the user simply supplies the field names for each field. The records are then read into a previously created file. The entire transfer process takes less than half an hour to complete the same 4,500 fields.

Once the database is set up, records can be quickly and easily searched with either of two wildcard searches (by field or

record), a general five-level search, or a phonetic search. A phonetic search would find, for example, both *Louis* and *Lewis*. While in the Search mode, fields can be replaced globally with different values.

DBMII comes with two sorts. The first is an in-memory sort with an immediate report option and the capacity to sort up to 2,500 records. Extremely fast, it can process 500 records in 30 seconds. It also permits the sort to be saved as a new database. The multi-level disk sort, however, is much slower (a two-level sort takes almost half an hour), but it can sort up to 40 fields at a time.

Up to 18 different calculations can be performed on fields. Multiplying a field by a constant, calculating the average of a number of fields, totaling the values of a field, calculating the date difference between two fields, and dividing two fields are some of the available functions. These functions are callable from the main menu, and some of them can also be accessed after formatting a report screen.

The Create/Change Report Formats Menu allows the addition of a non-preconfigured field to perform unplanned calculations. In addition, running totals for selected fields can be created by performing a subgrouping. Designing a report screen involves setting the columns, specifying the format (justification, insertion of commas and dollar signs, and spelling out of the date), designating totals (for calculation purposes), and setting skips (line feeds). Resetting the skip function invokes the Tab function. This feature can be annoying because it repositions all columns following set skips to the default columns. To get around this, set the skips first, then the columns. Besides standard forms, *DBMII* allows for formatting mailing labels.

In conclusion, *DBMII* (Version 1.3) is an impressive package that should satisfy the needs of many business people. Unlike most other integrated packages, *DBMII* works with software many PC owners already have. —Vincent Puglia

ResQ: Salvation from Complexity

DEPARTMENT	SALARY				
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		1018 S Wabash Ave			
		Champaign	IL 60605	404904	
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		410 Market St			
		Shreveport	LA 71101	194067	
Data Processing	27,500.00	Alice Horton			
		8 Daniels Place, NE			
		Cedar Rapids	IA 52402	303039	
Data Processing	32,100.00	Marlena Evans			
		799 51 St. NE			
		Fort Lauderdale	FL 33334	504830	
Data Processing	40,200.00	Doug Williams			
		9 Lawrence St			
		Belleville	IL 62223	684739	

A record in ResQ.

MY FIRST INTERACTION WITH *ResQ* was enticing, appealing, and downright enjoyable. What attracted me to this program I'm not exactly sure: perhaps its easy, painless approach to information management. I didn't have to shift into systems programmer mode to operate the software. Maybe it was the large-sized print, typeset user's manual with screens and messages accented in color. Or maybe it was that confident feeling of knowing that help was only a key-stroke away—wherever I was in the program. In any case, I quickly developed an affection for *ResQ*. This database management system's design objective is to rescue (ResQ) the user from the high-powered, but often frightfully intimidating, \$500-plus systems.

While *ResQ* scores high marks in user

friendliness, or, if you prefer, human factors engineering, the program is not without faults. Some things simply rub you the wrong way. For instance, it catapults back into DOS at unexpected times. Other drawbacks are more severe: You can't list a report directly on the printer. Too bad these gremlins had to rear their ugly heads, because *ResQ*'s assets are alluring. Perhaps Key Software followed the footsteps of numerous predecessors in the computer industry and rushed *ResQ* to the shipping docks before it fully ripened in the orchards of development and testing.

Whatever the case, I won't dwell on *ResQ*'s adolescence. This program is now gracing full-page ads in trade magazines, touting itself as the "easiest-to-use, fastest, and most comprehensive information management system ever developed for the PC." Marketing hype aside, is it a reasonable product?

Several areas of the system show an attention for detail rarely found in comparably priced competitors. You select form, index, and report names by using the arrow keys to position the cursor over the desired name. After you initially enter a name, you can later select that name from a table displayed on the screen. You never have to type the name again.

Individual data fields on forms may be

designated as normal display, bright display, underlined, flashing, or reverse video. This allows you to emphasize fields in different ways on the input form. The flexibility also prevents the cursor from disappearing—a problem that occurs in filing systems that always show data fields in reverse video mode.

ResQ's concern for detail extends to an audible warning. On most systems, an invalid entry in reply to a question or menu selection results in a beeping sound along with a message prompting for another response. In *ResQ*, the message is accompanied by a bass note, which is reminiscent of video games. This low, pleasant tone contrasts sharply with the high-pitched whine of many programs.

In addition to paying attention to the



This database management system's objective is to rescue the user from the complexities of the high-powered, \$500-plus systems.

ResQ

KEY Software, Inc.
2350 E. Devon, #138
Des Plaines, IL 60018
(312) 298-3610

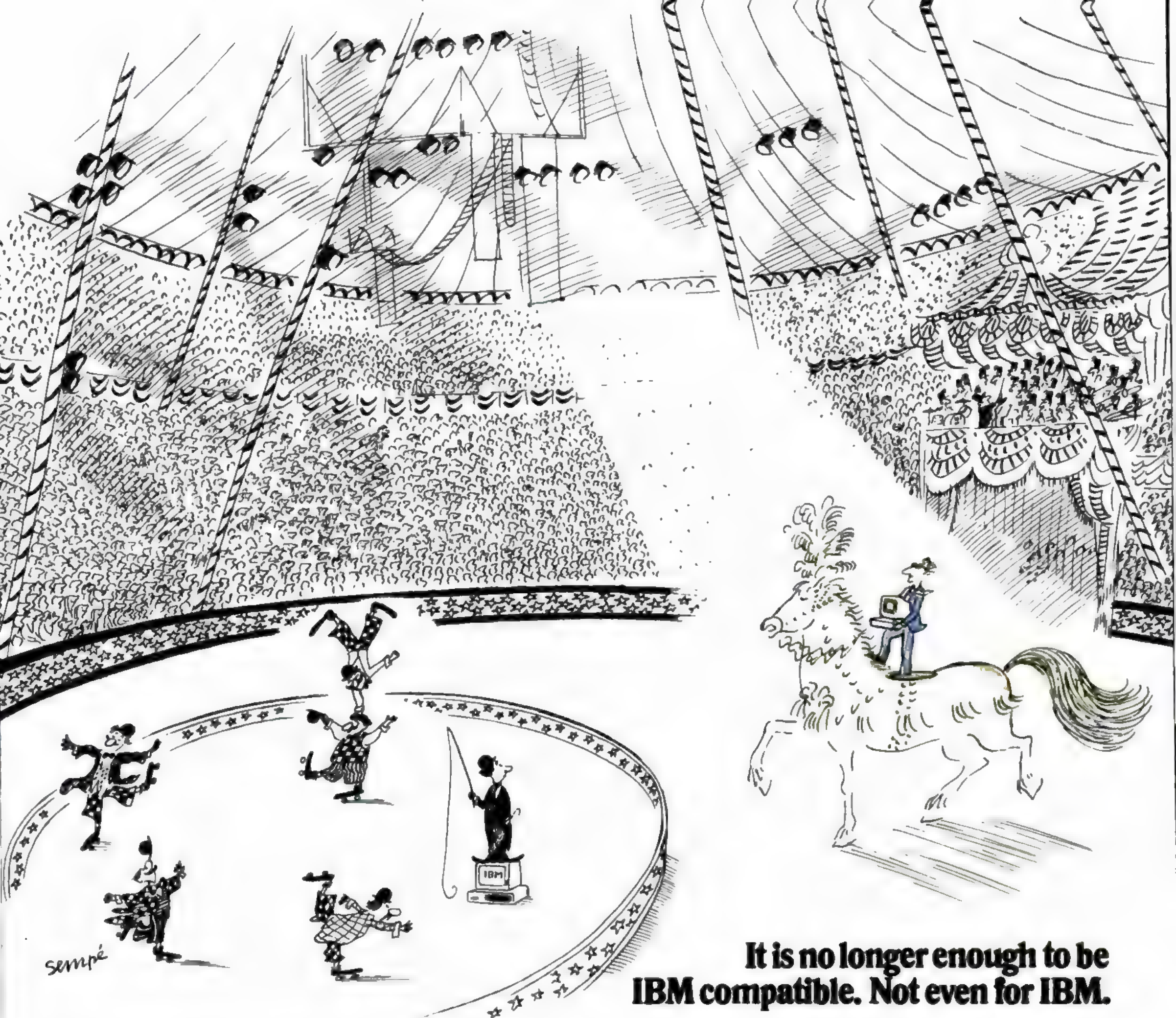
List Price: \$295

Description: File manager with indexing.

Requires: 128K RAM, two disk drives.

Records per File: 32,767

CIRCLE 735 ON READER SERVICE CARD



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CIRCLE 238 ON READER SERVICE CARD

finer points of user interface, the system can claim functionality not present in other products. Out of five database management products I analyzed, only *ResQ* offered an import capability. It accepted an ASCII file with fields in fixed positions. On top of that, the program directed the process in a forgiving, helpful manner. It did virtually everything except physically hold my hand, and it might have tried that if I had a mouse attached to the system. Not once did I open the manual to import a 500-record file.

Another feature that elevates *ResQ* above run-of-the-mill database systems is the join operation. This function extracts fields from two different files to form a third file—an invaluable commodity. All other operations can be carried out only on a single file. Thus, the join function pro-

ResQ has too much going for it to let a few lines of careless programming logic bar it from popularity.

vides some of the power of a multiple-file handling system in what is essentially a one-file program.

While this system from Key Software shines in many respects, rough spots mar the finish in a few key areas. First, I can't recommend *ResQ* for systems that use only floppy disks. The 872K of programs and system files distributed on three diskettes cry out for a hard disk. The slow speed of loading both programs and help screens reinforces this need.

To illustrate the aggravation of executing the program on floppies, consider the task of generating a report. I created a report format for 25 113-character records that included sort criteria. I then listed the report to a disk file. Total number of disk swaps: four. And if you inadvertently press a key other than Enter when *ResQ*

asks, "Function not present on diskette, please insert other *ResQ* program diskette and press Enter," the program inexplicably dumps you into DOS. This move elicited a less-than-polite gesture from me on more than one occasion.

Originally, I had wanted to list the report directly on the printer. Despite assertions in the documentation that direct printing is supported, I did not succeed. *ResQ* does permit printing through the PC's Shift-PrtSc key, which I invoked several times while executing the program to verify the printer interface.

My exasperation was further heightened by KEY Software's response to the dilemma. Its entire technical department of one person was in Cancun, Mexico, confined to his hotel within leaping distance of ceramic plumbing.

At that point, I resorted to improvisation and eventually managed to print the report by listing it to a disk file and then printing the file through the DOS TYPE command (with Ctrl-P, printer echoing, enabled).

Although some offerings on the *ResQ* menu taste half-baked, the full meal was delightful. The product lives up to its self-appointed title of easy-to-learn and easy-to-use. The manual could win a prize for being the least-read book published—a dubious distinction for most works of literature, but a tribute to a software product. The program's help screens put to rest the majority of questions (except how to get the printer working).

The pure physical mass of the programs necessitates a hard disk for practical use, which elevates *ResQ* above the needs of most individuals seeking a personal filing system. On the other hand, for business, office, or professional use, *ResQ* should be a prime contender.

ResQ has too much going for it to let a few lines of careless programming logic bar it from popularity. KEY Software plans enhancements, and present owners can upgrade their copies for \$20. Perhaps the new releases will squash the outstanding bugs. I hope so.—Edward Joyce



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Tilt Screen	YES	NO	YES	NO
Quiet Operation	YES (NO FAN)	NO	YES	NO
Memory	128K	128K OPTION	256K	256K OPTION
Graphics Display (640x200 resolution)	YES	OPTIONAL	YES	OPTIONAL
Printer Port	YES	OPTIONAL	YES	OPTIONAL
Communication Port	YES	OPTIONAL	YES	YES
MS™DOS/BASIC*	YES	OPTIONAL	YES	OPTIONAL
System Expansion Slot	YES	YES	YES	YES
RGB and Video Port	YES	OPTIONAL	YES	OPTIONAL
Typical System Price	\$2995	\$3843	\$4995	\$5754

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Quiet Operation (No Fan)	YES	NO
Ergonomic Display	YES	NO
Communication Port	YES	OPTIONAL
International Power Supply	YES	NO
MS™ DOS 2.11	YES	NO
Graphics Display	YES	YES
Typical System Price	\$2995	\$3710

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CIRCLE 347 ON READER SERVICE CARD

HP's New Printer: The Small,

If you've ever worked in an office equipped with several microcomputers and only one printer, you know the frustration that can ensue. Let's say you have to print a report and put it on the boss's desk in 5 minutes, only to discover that somebody has a half-hour's worth of figures grinding through the office machine. That's when you'll begin muttering about getting your own printer.

But before the company goes on a buying spree, there are several practical matters to be considered. First, there is the problem of available space. A micro takes up enough desk space without adding an unwieldy printer to the clutter. Noise is also a factor. Even one impact printer working at a lengthy report is loud enough to impede the normal activity of an office, and several going at once can be deafening. Last, but not least, is the cost of supplying a large number of employees with printers for their own use—a practice that would be beyond the means of most companies.

Hewlett-Packard hopes that its new 2225 ink jet printer will allay some of these problems. Ink jet printers, as a rule, are nicely quiet, somewhat unwieldy, and expensive. The HP 2225 has been developed as an inexpensive alternative for the large number of micro users who are looking for useful desktop or transportable printers. The company is releasing it with three different interfaces: the 2225A serial printer with an HP-IB interface; the 2225B with an HP-IL interface and an NiCd battery pack; and the 2225C parallel printer.



Silent Type



Hewlett-Packard's HP 2225 series of ink jet printers stuffs graphics capability, eight character sets, and respectable speed into a small, economical package.

HP 2225C Printer

Hewlett-Packard Company
1820 Embarcadero Road
Palo Alto, CA 94303
(800) 367-4772

List Price: Printer, \$495;
ink cartridge, \$7.95

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HP'S NEW PRINTER

Since the latter is configured for a variety of computers (including the IBM PC), the 2225C is being reviewed here.

Featherweight Class

If you're used to desktop-sized printers, the Hewlett-Packard machine may come as something of a shock. The 2225C weighs in at 5.5 pounds, and, at a width of 11.5 inches and a depth of 8.1 inches, it is one of the smallest of the quality printers to hit the market.

The HP 2225C comes with a paper separator, a power cord, a disposable print-head cartridge, a sample package of fan-fold paper, and, of course, a manual.

The printhead cartridge itself is an innovation. Most ink jet printers use a renewable supply of ink and a built-in printhead—either a long row of nozzles or a somewhat sloppier serial format. How-

Except for a slight blurring, the text was about as clean as I've seen from a dot matrix printer.

ever, the 2225C does not have its own printhead; instead, the ink cartridge holds the pen body itself. As a result, you change the printhead every time you replace the cartridge.

According to the people at Hewlett-Packard, the principle behind the cartridge is fairly simple. First, a tiny volume of ink is vaporized, creating a bubble. This small bubble forces the ink that has gathered above it through the cartridge's twelve microscopic nozzles and onto the paper.

The HP 2225C is easy to assemble. The printhead cartridge snaps into a holder at the front of the machine. The absorber, a rectangular piece of cardboard about an inch long, is placed in a holder directly in front of the spray nozzles and soaks up any excess ink that is generated. (The absorber

CHARACTER SETS

```

! " $ % & ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < =
P Q R S T U V W X Y Z [ \ ] ^ _ ` a b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~
! " $ % & ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [ \ ]
p q r s t u v w x y z { | } ~

```

0123456789:;<=
 PQRSTUVWXYZ[\]^_`'abcdefghijklmnopqrstuvwxyz{|}~0123456789:;<=
 !"#\$%&'()*+,-./0123456789:;<=?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]
 pqrstuvwxyz{|}~

PRINT PITCHES

```
MSSEEAARHLVFCSSDDDDNSCECFERFU !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopQRSTUvwxyz\]^_`abcdefghijklmnopqrstuvwxyz  
DXXXTXQZSYTFTRDL1234KYBNNHCSSSS !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopQRSTUvwxyz\]^_`abcdefghijklmnopqrstuvwxyz  
SSEEAARHLVFCSSDDDDNSCECFERFU !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopQRSTUvwxyz\]^_`abcdefghijklmnopqrstuvwxyz  
WZXTHQS5YTFTRDL1234KYBNNHCSSSS !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopQRSTUvwxyz\]^_`abcdefghijklmnopqrstuvwxyz  
SSEEAARHLVFCSSDDDDNSCECFERFU !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopQRSTUvwxyz\]^_`abcdefghijklmnopqrstuvwxyz  
XETXQZSYTFTRDL1234KYBNNHCSSSS !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopQRSTUvwxyz\]^_`abcdefghijklmnopqrstuvwxyz  
EAAARHLVFCSSDDDDNSCECFERFU !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopQRSTUvwxyz\]^_`abcdefghijklmnopqrstuvwxyz  
ZTXHQS5YTFTRDL1234KYBNNHCSSSS !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopQRSTUvwxyz\]^_`abcdefghijklmnopqrstuvwxyz  
EAAARHLVFCSSDDDDNSCECFERFU !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopQRSTUvwxyz\]^_`abcdefghijklmnopqrstuvwxyz  
XQZSYTFTRDL1234KYBNNHCSSSS !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopQRSTUvwxyz\]^_`abcdefghijklmnopqrstuvwxyz  
EAAARHLVFCSSDDDDNSCECFERFU !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopQRSTUvwxyz\]^_`abcdefghijklmnopqrstuvwxyz  
XQZSYTFTRDL1234KYBNNHCSSSS !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopQRSTUvwxyz\]^_`abcdefghijklmnopqrstuvwxyz  
EAAARHLVFCSSDDDDNSCECFERFU !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopQRSTUvwxyz\]^_`abcdefghijklmnopqrstuvwxyz  
XQZSYTFTRDL1234KYBNNHCSSSS !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopQRSTUvwxyz\]^_`abcdefghijklmnopqrstuvwxyz  
EAAARHLVFCSSDDDDNSCECFERFU !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopQRSTUvwxyz\]^_`abcdefghijklmnopqrstuvwxyz  
XQZSYTFTRDL1234KYBNNHCSSSS !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopQRSTUvwxyz\]^_`abcdefghijklmnopqrstuvwxyz  
EAAARHLVFCSSDDDDNSCECFERFU !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopQRSTUvwxyz\]^_`abcdefghijklmnopqrstuvwxyz  
XQZSYTFTRDL1234KYBNNHCSSSS !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopQRSTUvwxyz\]^_`abcdefghijklmnopqrstuvwxyz
```

99%?%99%99%99%99% !"#%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
O%?%99%99%99%99% !"#%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOP
Q%?%99%99%99%99% !"#%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQR
S%?%99%99%99%99% !"#%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRS
T%?%99%99%99%99% !"#%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRST
U%?%99%99%99%99% !"#%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTU
V%?%99%99%99%99% !"#%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUV
W%?%99%99%99%99% !"#%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ
X%?%99%99%99%99% !"#%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ

```

X&'^(>)*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN OPQRSTU VWXYZC
B'^(>)*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN OPQRSTU VWXYZC\
'^(>)*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN OPQRSTU VWXYZC\]
(>)*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN OPQRSTU VWXYZC\]^
>*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN OPQRSTU VWXYZC\]^_
*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN OPQRSTU VWXYZC\]^_ '
+,-./0123456789:;<=>?@ABCDEFGHIJKLMN OPQRSTU VWXYZC\]^_ 'a
,-./0123456789:;<=>?@ABCDEFGHIJKLMN OPQRSTU VWXYZC\]^_ 'ab
-./0123456789:;<=>?@ABCDEFGHIJKLMN OPQRSTU VWXYZC\]^_ 'abc
./0123456789:;<=>?@ABCDEFGHIJKLMN OPQRSTU VWXYZC\]^_ 'abcd

```

```

89: ; <=> ? @ A B C D E F G H I J K L M N O P Q R S T U V
9: ; <=> ? @ A B C D E F G H I J K L M N O P Q R S T U V W
: ; <=> ? @ A B C D E F G H I J K L M N O P Q R S T U V W X
; <=> ? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y
<=> ? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
=> ? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [
> ? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [ \
? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [ \ ]
@ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [ \ ] ^
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [ \ ] ^

```

A portion of the character listing generated by the HP 2225C's self-test.

HP'S NEW PRINTER

is supplied with the cartridge, and both should be replaced simultaneously.)

Before the machine can be used, it is first necessary to set a series of eight rear panel switches. This takes only a minute or two and is no more difficult than accommodating a printer by adjusting your software. The manual explains the settings to make for IBM PCs and PC-compatible machines, Apples, and Radio Shack computers. According to Hewlett-Packard, by adjusting switch 5 you can make the 2225C work with software designed for almost any printer.

These switches can also be used to adjust the printer for various conditions or languages. Switches 1 to 5 configure the defaults of the printer for carriage return and line feed definition, perforation skip mode, page length, and control sequence mode. Combinations of switches 6 to 8 change the character set from Roman8 (the default) to US ASCII, Swedish/Finnish, Norwegian/Danish, French, German, United Kingdom, and Spanish.

The printer comes with only three manual control buttons: line feed, form feed, and a blue button that sets top of form. The line feed advances either one line at a time, or in rapid feed if it is held down firmly. There is also a red power indicator, and a yellow attention light that indicates when the printer is out of paper.

The paper separator snaps onto the top of the machine. Paper is inserted from the back through a slot under the separator and slides through to the front, where it is pulled up by the pinfeed. Unfortunately, the paper can not be scrolled manually.

A Command Performance

Top of form is set automatically when the machine is turned on; to adjust it, the blue button is pressed. I had a little trouble setting top of form at first; the printer seemed to ignore the blue button and move a full sheet-length down from where it had previously stopped. However, it seemed to readjust itself after the first couple of tries. Similarly, the first time I ran *Word-Star*, the printer numbered the page some

4 inches from the bottom margin; afterwards, I had no problem with it at all.

Single-sheet stationery works quite well. The paper slides in under the separator, using the indentation in the top of the machine as a guide, and the bail arm holds the stationery firmly in place. If your letter needs more than one sheet of paper, the printer pauses at the end of the first sheet, and the yellow attention light goes on. Once you have replaced the paper, you hit the blue button and the printer resumes operation. The printer will scroll a couple of inches before beginning to print again, so you have to be sure not to start with too much of a top margin or your letter will begin at the center of the page.

The 2225C does not have its own printhead; instead, the ink cartridge holds the pen body itself.

The printer contains its own self-test, which is activated by pressing the line-feed button and turning the machine on simultaneously. This generates a full-page character listing and ensures that the machine is working properly. You end the test by switching the printer off.

One of the disadvantages of using ink jet printers is that they usually need specially coated paper; otherwise, the ink will soak into the paper and blur the print. The 2225 is no exception. It uses its own paper, which HP says will be available in both fanfold and single-sheet stationery.

Hewlett-Packard asserts that the 2225C runs at 150 characters per second. When it was run through the *PC Magazine's* printer speed test program (see "A Plentitude of Printers," *PC*, Volume 2 Number 5), it ran at a still respectable 91 cps. It is also nice and quiet.

A page of print on Hewlett-Packard's

paper was quite clear and readable; in fact, except for a slight blurring, the text was about as clean as I've seen from a dot matrix printer. I also ran regular bond stationery and cheap yellow scratch paper through it. The printing wasn't nearly as clear on the bond as it was on the company-supplied paper, but it was still quite legible. Even on the scratch paper it was clear enough to read, although the bleeding of the ink was fairly obvious.

If you like to manipulate your type a little, the manual has a section that explains how to use escape sequences and control codes to generate underlining, highlighting, and compressed, expanded-compressed, or expanded print pitches. The printer took these commands in stride and produced them with little trouble.

One of the plusses of ink jet printers is their graphics capabilities. When I ran a couple of three-dimensional bar graphs through the 2225C, they came out clear and crisp. The printer is capable of two dot densities: 96 × 96 dots/inch (the default) and, for higher quality graphics, 192 × 96 dots/inch. There are thorough directions in the manual for how to send the proper instructions to create graphics with either the Hewlett-Packard or any of the other 2225C-compatible computers.

The manual states that the cartridge, a small ink bladder hidden inside a plastic cover, contains approximately 3 cc of ink and will print about 500 pages of text. I did not run 500 pages through the printer, but after approximately 100 pages it was still going strong. After about 200 pages, an occasional quirk would appear about every 10 pages—notably, the omission of a few dots in a word or a small ink stain at the perforation of the paper. I checked the cartridge and there was an indentation in one side, indicating that at least 1/3 to 1/2 of the ink was gone. Except for the scattered glitches mentioned above, however, the print remained dark and clear.

Altogether, assuming that Hewlett-Packard supplies the paper and ink necessary for its use, the HP 2225C is a nice little printer to have around. ■

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More Than Just Plain

Volks

Volkswriter Deluxe is a souped-up, jazzy version of the popular Volkswriter word processor. It retains the speed and simplicity of the original while adding new power, features, and flexibility.

My love affair with *Volkswriter* began shortly after I bought my IBM PC in early 1982. I'd flirted briefly with *WordStar*, but I decided that I couldn't afford such expensive tastes. I'd also glanced at *EasyWriter*, but its poor showing in early reviews made it seem less attractive. Then a helpful salesman introduced me to *Volkswriter*. It was love at first sight. I knew that my husband, who is allergic to reading computer manuals, would flip over its on-disk tutorial. I liked its speed and its streamlined command structure. As a sometimes programmer, I was pleased that *Volkswriter* worked with ordinary DOS text files, so I could use it as a program editor. Thus, although it lacked some advanced features that might have been nice, such as the ability to perform "column moves" and display page breaks, I decided that it was just about everything I was looking for in a word processor. Throwing caution to the wind, I bravely signed the charge slip and



Illustration: Brad Hanan

MORE THAN VOLKS

took a copy home with me.

It's a decision I've never regretted. My husband, who uses *Volkswriter* to prepare research proposals, has never had to consult the manual (although he does ask me for advice from time to time), and I've found it to be an easy-to-use yet powerful writing tool that's more than adequate for my day-to-day needs as both a writer and programmer.

Since I review software for a living, I've often been tempted to stray. Still, although I've reviewed some of the fanciest word processors in the PC market, I've always come back to *Volkswriter*. It does what I need, quickly, and without a lot of bother. I like the way it uses function keys for common editing functions such as moving and deleting text, instead of cluttering up the screen with a lot of menus. I like its quick scrolling and fast saves to disk that don't penalize me for my tendency to store my work frequently. I like its ability to store printing instructions such as line spacing and margins in "print format" files that can be automatically attached to my documents. I like being able to control headers and footers using formatting commands in my text.

And finally, I like Lifetree Software Inc. It's a delight to do business with a firm that refuses to penalize its legitimate customers in order to foil software pirates. Because *Volkswriter* is not copy-protected, I can combine it on the same disk with compilers or other useful programs such as keyboard enhancers or spelling checkers. When problems have arisen, I've found the people in Lifetree's customer service department to be unfailingly

Volkswriter Deluxe

Lifetree Software Inc.
411 Pacific St. #3125
Monterey, CA 93940
(408) 373-4718

List Price: \$295 (\$90 for registered owners of *Volkswriter*)

Requires: 128K RAM, PC-DOS, 80-column display, two disk drives.

CIRCLE 745 ON READER SERVICE CARD

polite and helpful. And the company's update policy has been more than fair. I originally bought *Volkswriter* Version 1.1, and for only \$20 more, I received the much improved Version 1.2.

That doesn't mean that I didn't occasionally long for some of the features

Although I've reviewed some of the fanciest word processors in the PC market, I've always come back to *Volkswriter*.

offered by higher-priced word processing programs. I wished *Volkswriter*'s block moves were a bit more versatile. Its insistence on moving only full lines was sometimes bothersome, making it quicker to retype short phrases rather than move them. I wished that *Volkswriter* would accept lines of more than 80 characters so that I could edit spreadsheet files. And my husband, who prepares reports with lots of charts and tables, was irked that *Volkswriter* wouldn't allow column moves and that it didn't show page breaks while he was editing.

No Hesitation

So, when I received a flier announcing *Volkswriter Deluxe* (Version 2.0), which would add those extra features and a whole lot more, I didn't hesitate more than 5 minutes before sending Lifetree a \$90 check for the upgrade.

It was another inspired purchase. If there's any word processing program I like better than my old *Volkswriter*, it's *Volkswriter Deluxe*. The folks at Lifetree have managed to retain speed and ease of use while adding a slew of extra features. *Deluxe* doesn't limit text moves to full lines, it displays page breaks while you're editing, it accepts lines up to 250 charac-

ters long, it can use a "spill file" on disk so that document size is not limited to available RAM. *Deluxe* also includes a TextMerge option that allows you to create personalized form letters. It supports proportional spacing and microjustification. It lets you retrieve and store documents in different DOS 2.0 subdirectories, a real plus for PC-XT owners. And if you need foreign language characters or specialized character sets, *Deluxe* has a set of tools to allow you to type and print most of the characters in the PC character set. Now, that's a good deal for a \$90 upgrade on a \$195 program (\$295 for first-time purchasers).

Deluxe still has *Volkswriter*'s basic design, so old hands can start writing with it almost immediately. If you're new to the program, you'll have the benefit of *Volkswriter*'s excellent on-disk tutorial that shows you how to use the program while you're seated at the keyboard.

Unlike the earlier, simpler *Volkswriter* versions, *Deluxe* must be "installed" before you can get it up and running. This makes getting started a bit slower, but, for most users, the ability to tailor the program to equipment and tastes will more than make up for this initial inconvenience. The manual explains how to start the Config program, which then asks you a series of questions about your equipment and your word processing preferences. You tell it what kind of printer and monitor you have; then you select the features you want. Do you want the program to beep at you when it wants your attention or do you prefer silent running? Will you keep your document short enough to fit into your PC's available RAM (the fastest way to edit), or do you want a "spill file" on disk so that your editing will be slower but your document size limited only by available disk space? Do you want *Deluxe* to save the last version of your file as an automatic backup with the extension BAK, or do you want to create your backup files yourself? If you decide later on to change your mind, it only takes a few minutes to run Config again.

MORE THAN VOLKS

Personally, I like speed, and with 320K RAM in my PC, I have more than enough internal memory for almost all of my writing. So I opted to do without a spill file. I also trust my backup habits to keep me out of trouble, so I chose to do without *Deluxe*'s automatic backup in exchange for faster saves to disk. But that's just my personal taste. Someone else with less internal memory or with a hard disk might choose a different array of options. Letting the user decide how the program will work is a bit of intelligent design that other software companies would do well to imitate.

I'd give *Deluxe*'s Config program an unqualified rave were it not for the scanty documentation that may leave many new *Volkswriter Deluxe* owners scratching their heads. It's not the end of the world because the manual gets you started well enough and most of Config's questions are self-explanatory. However, neither the manual nor Config tell you how to install *Deluxe*'s special print fonts.

According to the manual and the tutorial, *Deluxe* can tell supported printers when to use their special typefaces or fonts. I followed the directions and used the Shift key together with the F3, F4, F5 and F6 function keys to mark the special fonts in my text. But my Epson MX-100 didn't think anything special was happening. It just printed its ordinary, everyday typeface for the entire text.

I called Lifetree to find out what I was doing wrong. The customer service representative explained that I had to run the Config program again to tell *Deluxe* which fonts I wanted it to use with which function key. This made the installation process much more complicated. Instead of merely choosing my printer from the list of 18 supported printers, I had to "modify an existing printer table" and tell *Deluxe* the Epson control sequences that would invoke each font. I pored over my printer's manual and came up with the right codes, and, after a bit of experimentation, I assigned normal typeface to the Shift-F3 key combination, italics to the

Shift-F4 combination, compressed type to Shift-F5, and double-space type to Shift-F6. It wasn't too cumbersome, as such things go, but I do wish the manual and the tutorial had been more explicit.

Writing Is a Pleasure

Now that I have my new *Deluxe* working, writing with it is a pleasure. It's even speedier than earlier versions of *Volkswriter*. Scrolling to a new page takes less than a second, shaving half a second off of my *Volkswriter 1.2*'s time. Moving between different menus is faster than before, too. If you want to see the print menu, for instance, *Deluxe* will get you there in about 1 second, as opposed to 4 seconds with Version 1.2. (Note that I made these tests using a floppy disk drive. Because *Volkswriter Deluxe* reads from disk when

Letting the user decide how the program will work is a bit of intelligent design that other software companies would do well to imitate.

it moves between menus, a hard disk will work with even less delay.)

Unfortunately, *Volkswriter Deluxe* doesn't have the same crash safety record as earlier models. I drove my new VW *Deluxe* through my own computerized version of a demolition derby, and while it came out largely unscathed, it wasn't as crash-proof as Version 1.2 was. I tried to save a document on a full disk, and it warned me with a polite message and gave me the opportunity to save the file on a fresh disk. I exceeded the available internal memory, and again it warned me and gave me a chance to save my work. I tried to use a spill file that was too big for my

floppy disk and *Deluxe* warned me to switch disks. But when I disregarded the warning the program froze dead in its tracks and I had to turn my PC off and on again to recover. *Volkswriter Deluxe* is stupid-proof but not idiot-proof.

The program did crash once, when I used its Block Delete function to erase an entire document from memory. Somehow that jangled its internal circuits and the program dumped me back to DOS. This bug is unlikely to cause any real trouble because it only occurs when you try to erase everything you've written. There can't be any lost work to mourn.

One significant improvement over earlier versions of *Volkswriter* is *Deluxe*'s ability to display page breaks while you're editing. *Deluxe* marks the end of each page with a line of type in reverse video on my bargain monochrome monitor. If you have an IBM monochrome monitor, the last line of each page will be underlined. If you're working with a color display, the line will be in color. (You can pick the color when you run Config.) If you want to insert your own page breaks, insert the *Volkswriter* ..PAGE command at the left side of a new line. You'll see the page-break marker jump to the line you've indicated.

My husband loves this feature. In *Volkswriter* Version 1.2, when he wanted to print a complex report with many charts and tables, he had to "print" the document on the screen to see where the page breaks fell. Then, if he changed just one page break with a ..PAGE command, he'd have to go through the entire procedure again to make sure ensuing page breaks didn't interrupt a chart or a table. Now, with *Volkswriter Deluxe*, he can control the page breaks in his reports without having to preview the printed document on the screen.

Deluxe also makes it easier to use special effects on your printer. Instead of inserting printer control codes in your text, you can press the Shift key in combination with the Function keys to tell your printer to produce subscripts and superscripts,

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SOFTWARE

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FCM (was First Class Mail)	79.
UltraFile (file/report/graph)	119.
Digital Research	
CP/M-86	39.
Dr.LOGO	69.
Financier	
Financier II (was Personal Series)	117.
Financier Tax Series	97.
Funk Software	
Sideways	49.
IUS	
EasyWriter I System	
EasyWriter I, EasySpeller I, EasyMailer I .	159.
EasyWriter II System	
EasyWriter II, EasySpeller II, EasyMailer II	195.
EasySpeller II for EasyWriter II	59.
EasyMailer II for EasyWriter II	59.
Accounts Receivable	299.
Accounts Payable	299.
General Ledger	299.
Inventory	299.
Order Entry	299.
Package Price for any three above	859.
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PC CONNECTION®

boldface characters, underlining, and even overstrikes. As already mentioned, pressing the Shift key together with Function keys 3 through 6 can invoke special fonts.

Using these special effects inserts extra characters on the screen that you won't see in your printed document. For example, if you use the Shift-F7 combination to indicate that the word *special* should appear in boldface, you'll see a double-sided arrow character before and after the word. This can be a bit of a nuisance if you're trying to align columns in a table. Fortunately, *Deluxe* has a "proof key" (actually the Ctrl-F3 key combination), that eliminates all of the extra characters from the screen so that you can see exactly how the printed text will appear.

Text Merge

If you need a form-letter generator, you may decide that *Deluxe's* TextMerge feature is worth the cost of the whole program. Like *Volkswriter* itself, I found TextMerge to be powerful yet easy to use. Using a master mailing list, it can substitute information about each of your correspondents into a form letter. It's easy to learn if you follow the on-disk tutorial that shows how to use a sample mailing list to print sample form letters and mailing labels.

One limitation of TextMerge is that each "data record" (the name, address, and other information about a single recipient), must fit on a single line. Thus, the record must be no longer than 250 characters. On the positive side, TextMerge uses a very common data format, in which the data items are separated by commas. Popular database programs such as *dBASE II* can produce master lists in this format with no trouble, as can programs written in BASIC. Thus, many people will find it easy to convert other data files to the TextMerge format.

And, as the admen say, that's not all. If you need special characters for foreign languages or mathematics, *Deluxe* can put most of the PC's 256 characters at your

service. This isn't as simple as it may sound, since many word processors allow you to use only the 128 ASCII characters. However, the IBM PC has the ability to use an "extended ASCII," with an additional 128 characters defined by the PC's designers. If a program permits, the hard-

Deluxe lacks a soft hyphen, which would allow you to indicate where long words should be split if necessary.

ware has the ability to display the accented characters of French, German, and Spanish as well as Greek and mathematical symbols.

Volkswriter Deluxe uses this capacity in three ways. First, if you use a PC made for the European market, you can use one of the DOS keyboard translation programs provided with European machines to transform the PC's keyboard into a standard French, Spanish, German, or British keyboard. *Volkswriter Deluxe* will then display the characters produced by these alternate keyboards. Or, if you have an American PC, you might want to use *Deluxe's* built-in alternate keyboard. To use it, press the Alt key together with any number or letter. These combinations will produce all of the Latin alphabet's vowels with all of the European accents.

If neither of these approaches works for you, *Volkswriter Deluxe* lets you customize its own keyboard translation table to make your keys produce any characters you want. By carefully following the instructions in the manual, I changed my keyboard so that it would produce mathematical symbols. Some examples would have been helpful, but the explanations were adequate.

Similarly, *Deluxe* allows your printer to produce many accented letters and other

special symbols by combining characters your printer already knows how to print. For example, it produces the British pound sterling sign (£) by combining a capital L with a lowercase f. But if your printer has a better way to produce these symbols, you can change *Deluxe's* printer translation table. My Epson printer writes a very handsome pound sterling sign if you send it an ASCII 129 instruction. Once again, I followed the instructions in the manual and was soon producing my Epson's own pound sign instead of the combined L and f. The ability to customize your keyboard and printer to match your needs is another example of the power and versatility of *Volkswriter Deluxe*.

Ready for the Majors?

Do these new features put *Volkswriter Deluxe* in the major leagues with the likes of *WordStar* and Microsoft's *Word*? Well, not really. While *Deluxe* has many big-league editing abilities such as column moves and variable margins, remnants of its minor-league days can still be found. For example, its Search function is still "case sensitive." That is, if you want to find the word *hippopotamus*, *Deluxe* will look for the word exactly as you typed it in, all lowercase letters. If you happen to start a sentence with *Hippopotamus*, or use *HIPPOPOTAMUS* in all caps in a heading, *Deluxe* won't find it for you. Also, unlike some of the newer word processing programs, *Deluxe* can let your paragraphs get badly out of kilter when you're inserting text. To get everything nicely realigned, you have to move the cursor back to the beginning of the paragraph and press the F8 key, the "reformat" key. Nor does *Volkswriter Deluxe* have windows that let you see more than one document at a time. But, if you can remember what's in your disk files, it will let you add parts of other files to the document you're editing. This can be great for boilerplate text that you use over and over again, and it will prove quite useful to programmers who like to use bits of old programs when building new ones.

MORE THAN VOLKS

With these exceptions, I think *Deluxe's* editing capabilities are competitive with the big boys. In print formatting, however, *VW Deluxe* is more like a Beetle than a Mercedes. For example, its ability to display page breaks while you're editing works only when you use the same line

In print formatting, *VW Deluxe* is more like a Beetle than a Mercedes.

spacing throughout your text. If you include a paragraph of single-spaced text in a double-spaced document, *Deluxe* will get its line count wrong and show your page break in the wrong place.

Furthermore, while Lifetree says the program supports proportional spacing and microjustification (I was unable to test these features because my printer doesn't support them) *Deluxe* lacks a soft hyphen, which would allow you to indicate where long words should be split if necessary. This makes right-justified text less attractive and/or more difficult to produce.

Finally, unlike some other top-of-the-line programs, *Volkswriter Deluxe* lacks a print spooler. If you want to keep typing while your printer is working, you'll need to "print" your document to a disk file, and then go to DOS. You can then use a separate print spooler program, to send the contents of your disk file to the printer. Then, you can reenter *Volkswriter Deluxe* and get on with your work. That's much less convenient than using a spooler that's an integral part of your program.

Happily, none of these deficiencies really bother me. I might miss having a print spooler if I didn't already have a print buffer program that lets me go on writing while my printer is printing. Aside from that, *Volkswriter Deluxe* does all the things I really need. And it does them well. I intend to be loyal to my new love—that is until Lifetree comes out with a *Volkswriter Grand Deluxe*.



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CIRCLE 107 ON READER SERVICE CARD



XyWrite

Way To Go

ATEX, the widely used high-performance commercial word processing system, now has a versatile and powerful little brother, XyWrite II-plus.

I was once a confirmed *WordStar* user who sniffed disdainfully at the other word processing programs. They did not, in my estimation, measure up to *WordStar*'s overall performance even though they had certain features that *WordStar* lacked. Then two things happened: My office got ATEX, a high-performance commercial word processing system used by publishing houses and newspapers, among others. It improved productivity by 50 percent. Soon after that a supervisor told me about *XyWrite II-plus*.

XyWrite II-plus (hereafter *XyWrite*) is patterned after ATEX but it offers more features than its predecessor. (A full and detailed description of its features would take up most of this magazine, but see the sidebar "Why XyWrite Is Special" for a partial listing.)

When *XyWrite* boots up, you are presented with a screen with three lines at the top. The first line is a command line, from



Illustration: Brad Hanau

XYWRITE

which you execute textual (as opposed to keyboard) commands. The second line is the prompt line, which displays function or error messages, tells you the name of the file you are working on, and whether the Caps Lock, Num Lock, Insert, or Scroll Lock keys have been activated. When you tell it to do something, it politely responds "DONE," once the task has been carried out. The third line can be set to display any one of three function key reminders, or a clean straight line.

All of the standard operations are available from within the text you are creating. Figure 1 lists the principal items. To work on more than one word or line at a time, *XyWrite* asks you to "define," or identify, the text on which you wish to work. Text can be defined a word, line, sentence, or paragraph at a time, or by placing markers at the beginning and end of the block. Once defined, text can be deleted, moved, copied, highlighted (with underscores, boldface, reverse display and so on), assigned to a macro key, separately saved in a file, or separately printed.

If you want to perform a task that cannot be done from within the text, you move the cursor to the command line (by hitting the F5 key) and enter your command, either in its fully worded form or, in many cases, as a two-letter abbreviation. You then execute the command by hitting either the Return or F9 keys. The command stays on the command line, even after execution, so that if you have a command that you want to use more than once, you don't have to move the cursor back up to the command line. Even when the cursor is in the text, you can execute commands that are on the command line just

XyWrite II-plus

XYQuest Inc.

P.O. Box 372

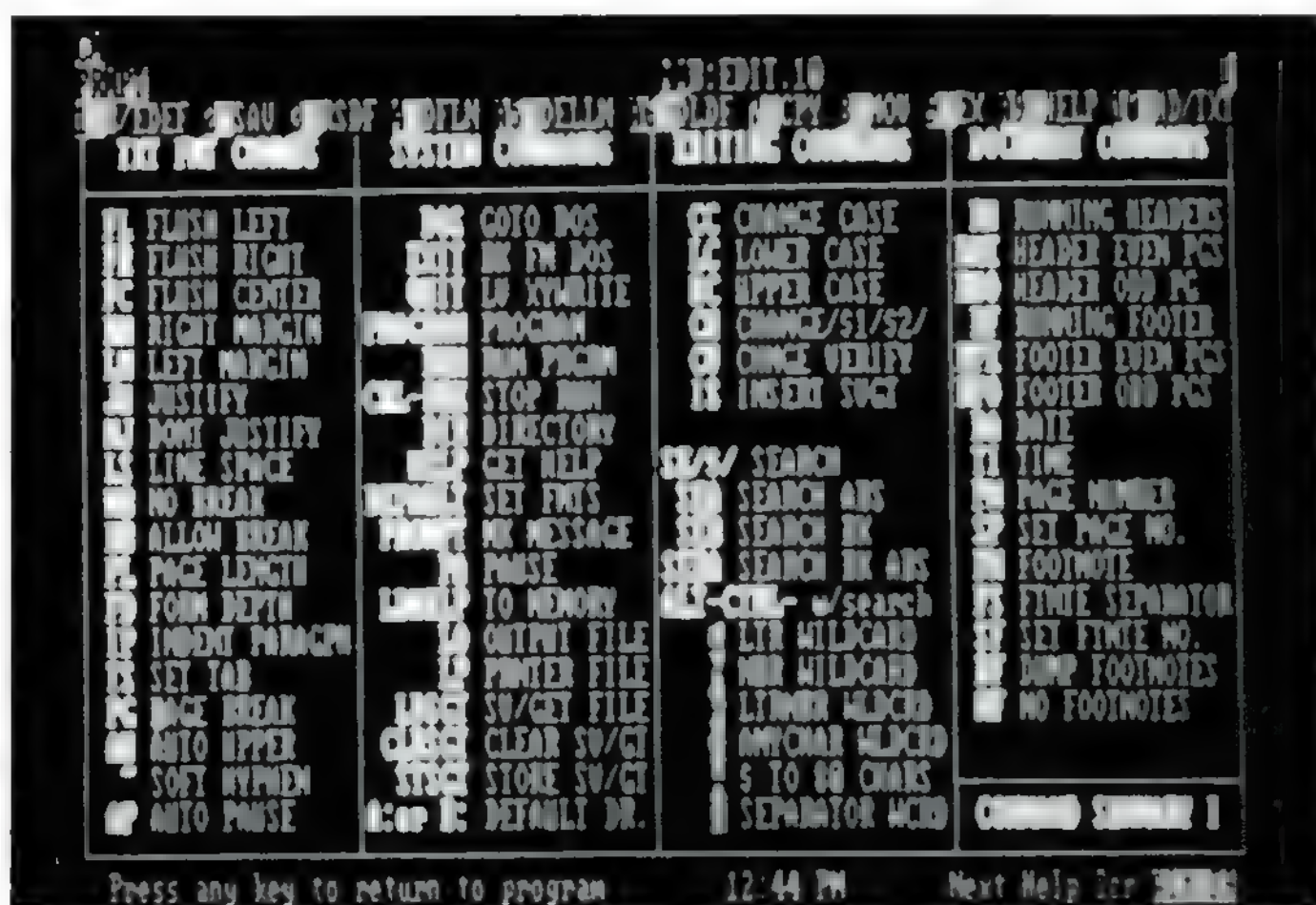
Bedford, MA 01730

(617) 275-4439

List Price: \$295

Requires: 128K RAM, one disk drive.

CIRCLE 746 ON READER SERVICE CARD



This screen displays *XyWrite II-plus*' text-formatting commands. Notice the straightforward logic inherent in the choice of command terms.

by hitting the F9 key again.

Command line functions can perform most any operation you might need, including search, search and replace (verified or global), change defaults, change text formats, save and continue, save and exit, load new printer or keyboard drivers, merge other files, and create footnotes or headers or footers—to name a few. When you give a command that affects the format of the text or creates a footnote, a small bright triangle is embedded in the text at the cursor's previous position. You can make changes like these as often as you want, and all text following the marker (or, in some cases, starting on the line below the marker) will conform to the new command. If you want to see what a particular triangle represents, place the cursor on it, and the command it represents will appear on the prompt line.

One of *XyWrite*'s nicest formatting functions is the one that allows you to specify the indentation of both the first line of a paragraph and then the remainder of the paragraph. You set this by entering

IP n1, n2

XyWrite automatically capitalizes the first

letter of each sentence. All you have to do is think and type. It's so sophisticated, it's simple.

Text Display

XyWrite has three methods of displaying text. The first, and main one, is the standard format, in which the results of all of the formatting commands (except for footnotes, footers and headers, and page breaks) appear on the screen. Underlines and bold face, are also displayed. If you want to see the text of the footnotes or of all of the command triangles in the text, you can switch to the expanded format (by hitting the Ctrl-F10 key combination), and the screen instantly displays unformatted text that spells out all the embedded commands by enclosing them in European-style double-angle brackets for identification. In this format, the commands themselves can be edited, so if you want to change the margin or edit a footnote, you don't have to erase the old entry and start from scratch. You can make the change directly in the command, and then go back to the standard display (by hitting Ctrl-F10 again), where the changed command will be immediately reflected.

The third method of display (entered by pressing Shift-F10) creates a temporary review file, in which all commands are implemented, including footnotes, headers, and footers. This allows you to see exactly what the page will look like when it's printed. *XyWrite* asks you whether you want this final format file displayed on a split screen or an alternate screen and prompts you for your reply. You can achieve the same result by entering the REVIEW command (you can type RV) on the command line and letting *XyWrite* convert your original file to a fully formatted one. This method is more efficient for long files. The formatted file can be edited, but, if you add or delete text, you have to be careful not to louse up the pagination, margins, footnotes or headers.

Documents are printed by issuing the TYPE command (by entering TY) at the command line, and *XyWrite* allows you to print only certain pages, to pause after each page for the insertion of fresh paper, or to print a series of documents in succession. You can print either a disk file, a defined block of text, or the document that is up on the screen. The program comes with drivers for most of the better-known printers, and since these drivers are ASCII files, they can be supplemented or changed to utilize nonstandard features of those printers. You can also write a driver file for a printer that is not on *XyWrite*'s list. Printer driver files can be changed at any time, which makes it possible for you to print a draft of document on a high-speed dot matrix printer, then load a different driver to print it out in final form on a letter quality daisy wheel printer. Also, since the printer driver files interface with the mode display commands that are embedded in the text, you can rewrite the driver file to call up printer features that do not show up on the screen. For instance, daisy wheel printers obviously won't print in reverse screen mode, so you could modify the driver file to let the reverse screen mode to signify a condensed spacing mode.

XyWrite handles highlighted text with

Why XyWrite Is Special

This word processor has features you could only dream about until now.

There are many reasons why *XyWrite* stands head and shoulders above previous generations of word processing programs. Here are just a few of them.

1. It's fast! *XyWrite* holds everything in RAM (to the extent of available memory), so you can move from the top to the bottom of a 100k document (and back again) as quickly as you can press the keys (Ctrl-End or Ctrl-Home). Paging is instantaneous, and straight scrolling is fast and smooth. Paragraphs are reformatted instantly as you insert, move, or delete material.

2. It has extensive macro facilities. You can create macros on the spot, save them to files, and load them from the files at any time.

3. It has extensive programming capabilities. You can write program files to perform any function that you can perform from the keyboard—and then some. These program files can be run directly by you at any time, or called from a macro key, or called from within another *XyWrite* program.

4. It has total customization capabilities. The way the program comes up, and its parameters and defaults, can be changed at any time—either interactively or from program files—without hex patching or anything else like that. Printer drivers can be altered and loaded at any time.

5. It offers keyboard remapping under software control. The keyboard is laid out by an ASCII file that is loaded when the program boots. Different keyboards can be cloned from the original file, so that you can use the Dvorak keyboard, or create a scientific or other spe-

cialized keyboard, simply by changing the values of the keys in the file. The different keyboard files can be loaded at any time, even in mid-document.

6. You can run almost any other application program from within *XyWrite*, or you can call up DOS and perform any DOS function, even in mid-document. When you exit from DOS or the other program, *XyWrite* resumes where it left off. This can be done interactively, or through a program file written to do it for you.

7. There are four Help screens available at any time, and if you don't like the ones that come with the program, you can write your own. That way you can have exactly the information you want available to you at all times.

8. Arithmetic functions can be executed either on the command line or on numbers in your text.

9. It possesses a large collection of well-implemented bells and whistles including footnoting (with no practical limit on the footnote size), table of contents and index capabilities, split screen or alternate screen, a flexible form document (mail merge) facility, automatic uppercase of the first letter of a new sentence, formatted display, restoration of the most recent deletion, and many more.

What are *XyWrite*'s drawbacks? Only that the full mastery of all of these facilities takes a little learning. The basics, however, are easy to learn, and the documentation is very helpful. More importantly, the architects of this product are knowledgeable, friendly, and readily available if you have any questions.

—P.H.W.

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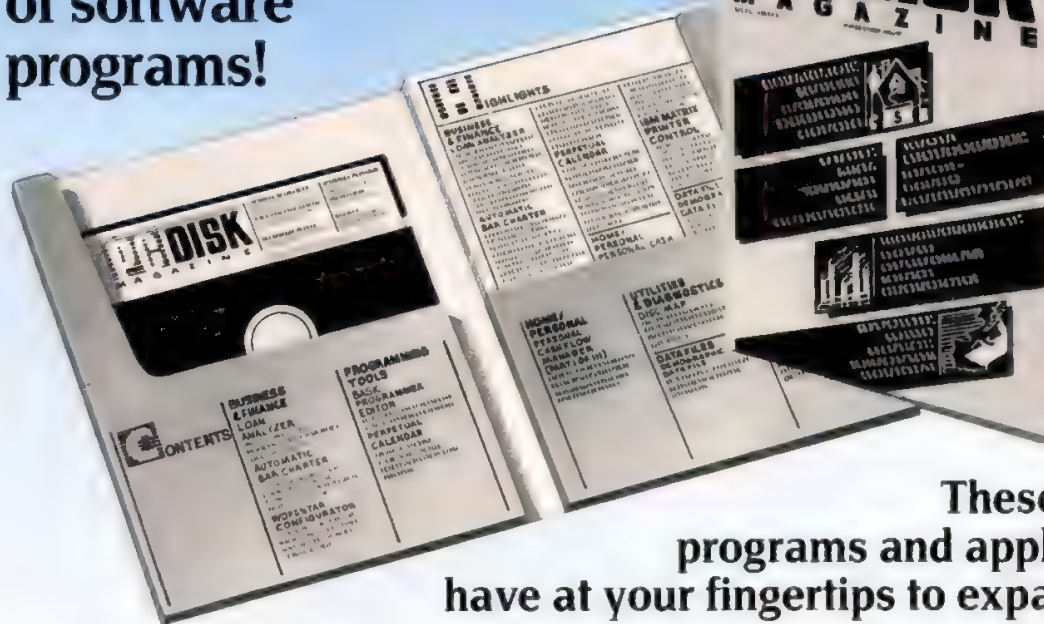
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power and convenience. As noted, text can be highlighted by defining it and then issuing the appropriate command. The appropriate command in this case is either a MODE (enter MD) command on the command line, or simply hitting a Ctrl-*n* key combination, where *n* is a digit from 0 to 8. (See Figure 2 for a description of the available options.) Highlighted text can also be created as you go, again by giving a MODE command from the command line or, more easily, just by hitting the appropriate (Ctrl-1 key combination while in the text. All the text between that command and the next one will be in the specified mode. Editing mixed highlighted and standard text is particularly easy: You simply hit the Ctrl-0 key combination before you start editing, and the program will enter new text in whatever mode is in effect at the cursor location. There is no need to worry about whether you have issued the correct MODE command before making your insertions.

Program Files

Creating program files is extremely easy. Instead of creating a new file with the NEW (enter NE) command on the command line, you give the PROGRAM

command followed by the name of the file you wish to create. Then press the Scroll Lock key and "act out" what you want the program to do. For example, if you want the program to move the cursor to the command line, you hit the F5 key. The

XyWrite has the ability to instantly access DOS or other programs from within itself, which allows for a great deal of flexibility.

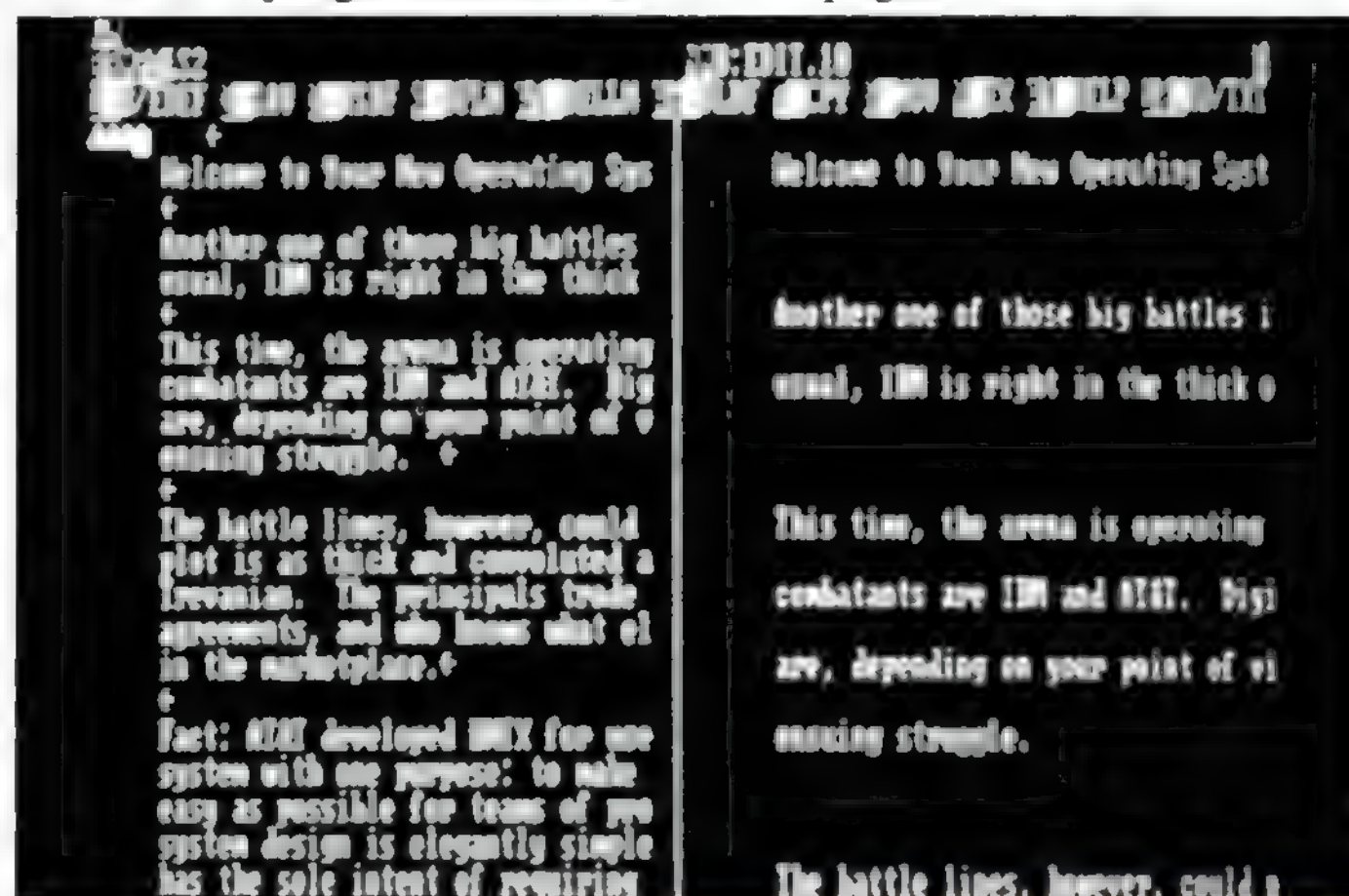
cursor stays in the text of the program but XyWrite records internal commands that correspond to the F5 key in your program file. To edit the program text, you have to toggle the Scroll Lock key on and off, because if you simply hit the Backspace key in hopes of deleting a character, XyWrite will instead record in the program that you want a backspace to occur as part of the program. After the file is created

and saved, you make it perform by entering RUN on the command line. You might want to assign programs you are going to use often to a macro key so that you can run them by hitting the appropriate Alt-key combination.

In addition to these "copy cat" program files, you can write program files that use an extensive vocabulary of operators, both functional and logical. These include conditional and Boolean functions, as well as cursor controls and jump capabilities. I haven't yet used them myself.

Macros (which XyWrite calls "save/gets") are created by "defining" the text you want and hitting the F2 key and the key to which it is to be assigned. Hitting the appropriate Alt-key combination recalls the text. If you want to assign a macro to a key that already has a macro assigned to it, you have the choice of either overwriting the prior macro or adding the new macro to the existing one. Macros in memory can be assigned to a file and saved by entering the STORE-SAVE-GET (STSGT) command on the command line. This file of macros can be recalled at any time and loaded onto the appropriate keys. You can have as many files of macros as you want and can load them at any time, even while in the middle of a document. You can have 36 macros in memory at any one time—assigned to Alt-key combinations with the 26 letter and the 10 digit keys. You can assign a program to a macro key by entering the LOAD PROGRAM (LDPM) command on the command line, and that assignment can be saved in a file, the same way that macros are. If you don't save the macros to a file, they will be lost when you exit XyWrite. The macros that are currently held in memory can be listed on the screen at any time, temporarily overriding any text display, by hitting the Alt-F2 key combination.

Split or alternate screens are created by hitting Alt-F10 and responding to prompts that ask whether you want a horizontal or vertical split or a full alternate screen. The



This screen display demonstrates XyWrite II-plus' ability to set up columns and format each one differently.

ATEX, XyWrite's Big Brother

XyWrite was originally conceived as a PC-sized implementation of ATEX, which makes it especially attractive to ATEX users.

While most word processing programs must compete solely on the basis of their individual merits, XyWrite has an added attraction to many publishing firms: It is similar to ATEX, a powerful in-house production system.

ATEX, which is manufactured by ATEX Data Processing Systems, Inc., allows publishers to process articles more quickly and efficiently, from the time a raw manuscript arrives right up through typesetting. As each article is received, the system creates a file and puts it through a complete editing cycle (including word processing, typographic composition, hyphenation and justification and a program called "Spelling Checker" that consults a 140,000-word dictionary and then flags anything it doesn't have a match for). Once everybody is happy with the finished article, the file runs through another program that converts it into binary code for the typesetting machine. If the publishing house wishes, ATEX can also produce an electronic page makeup. This is a page of type that the editors can use to find out exactly how many lines will appear on the page and what the page

will look like.

It is no coincidence that XyWrite is so similar to ATEX. XyQuest, the small company that manufactures XyWrite, was started by two former ATEX employees who were attempting to enable a PC to emulate an ATEX terminal. Consequently, many of the commands used in the XyWrite system are the same as those used in the larger ATEX system.

According to Lloyd Schultz, Production Systems Director for Ziff-Davis, Inc. (the company that puts out *PC MAGAZINE*, among others), that XyWrite is compatible with ATEX is a definite plus. "Let's say you have a bureau in California or Boca Raton. If they have PCs, they write their stories and transmit it asynchronously into New York. You've got to get it into ATEX, call it up on the screen, edit it, code it for typography, and send it to the typesetter. It's easiest for ATEX if the software the bureau uses is XyWrite. If the XyWrite file is properly prepared, we really don't have to do any editing to turn it into an ATEX file — it is an ATEX file."

—Barbara Krasnoff

location of the horizontal or vertical split is up to you. You cannot have more than one split or alternate screen at a time. From within each screen you can do anything you could do from the original screen—it is like having two separate XyWrite programs active at the same time. However, if you change subdirectories (in DOS 2.0) while in one screen, the directory is changed for the other screen, too. This does not affect what you are doing on the screen, but it does affect the place where

the file would be saved. Text can be moved from one screen to the other simply by "defining" it, switching screens and issuing either the COPY or the MOVE command (by hitting the F7 or F8 keys, respectively). If it's not convenient to make the move at a particular time, the text can be assigned to a macro and dumped into the second screen later.

XyWrite has the ability to instantly access DOS or other programs from within itself, which allows for a great deal of

flexibility. You can run a spelling check program by entering the DO command on the command line, or, with some programs, by going to DOS and then calling up the spelling program. If you have enough RAM, you can even create a stack of XyWrites by calling it up once, calling DOS, calling XyWrite again, and so forth. You can work in whichever DOS or XyWrite you find yourself, and when you exit, you snap back into DOS or XyWrite, whichever is next in the stack. As a result, I find myself using XyWrite as my command center and calling up dBASE II, or my terminal communications program from within XyWrite. This is easy to do, especially since I have written programs

Hyphenation is not automatic, but you can insert soft hyphens.

that do all the calling for me by simply hitting one key combination.

A few other items should be mentioned. Hyphenation is not automatic, but you can insert soft hyphens by hitting the tilde, and the word will be broken and hyphenated at that spot, if necessary. Columns can be defined and treated in the same matter as any other defined text block. The replace and search functions accept wild cards representing letters, numbers, variable length strings, and any ASCII character. Unbreakable blocks can be created to avoid an ungainly printout. Text can be justified right, left, both, or centered. You can have text lines of up to 255 characters, with instant horizontal scrolling.

XyWrite handles directories in a clever way. To see a directory of the files contained in the subdirectory or disk that you are working in, or in another drive in your system, you type DIR on the command line (preceded by the drive letter, if you are not calling the default drive) and hit the Return or F9 key. (This must be done on a

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XYWRITE

F1	Define block beginning, end.	Alt-F10	Split screen/go to alternate screen
Alt-F1	Begin column define.	Ctrl-F10	Expanded/normal format
Alt-F4	Define word.	Shift-F10	Page format review
F4	Define line.		
Ctrl-F4	Define sentence.		
Shift-F4	Define paragraph.		
F2 char	Assign defined text to Alt-char.		
Shift-F2 char	Append defined text to existing key		
Alt-F2	Display summary of macros assigned all keys.		
Ctrl-F2 char	Display full text of macro assigned to this character.		
F3	Cancel current definition of text.		
F7	Copy defined text, leave orig.		
F8	Move defined text, cancel orig.		
Alt-Del	Delete word.	Alt-arrow	Move cursor one word
Alt-Bksp	Delete word left	Ctrl-arrow	Cursor to end of line
Ctrl-Del	Delete to end of line.	Home	Cursor to top of screen
Alt-F5	Delete line.	Ctrl-Home	Cursor to top of file
Alt-F6	Delete defined text.	End	Cursor to end of screen
Alt-F3	Restore deleted text.	Ctrl-End	Cursor to end of file
PgUp	Up one screen		
Ctrl-PgUp	Up one line (or scroll continuously, if held down)		
PgDn	Down one screen		
Ctrl-PgDn	Down one line (or scroll continuously, if held down)		
Arrows	Normal operation, one space or one line		
Alt-F9	Display Help screens (four successively available)		
Ctrl-F9	Change Function Reminder Line in header on screen		
Alt +	Add number under cursor		
Alt -	Subtract number under cursor		
Alt =	Insert total at cursor		

Figure 1: A list of editing and display functions available within XyWrite II-plus text.

Mode	From Command Line	Control Code
Normal	MD NM or MD 1	Ctrl-1
Bold	MD BO or MD 2	Ctrl-2
Underline	MD UL or MD 3	Ctrl-3
Reverse	MD RV or MD 4	Ctrl-4
Bold Underline	MD BU or MD 5	Ctrl-5
Bold Reverse	MD BR or MD 6	Ctrl-6
Superscript	MD SU or MD 7	Ctrl-7
Subscript	MD SB (or SD or 8)	Ctrl-8
Universal	-	Ctrl-0

Figure 2: A list of XyWrite II-plus' highlighting and displaying modes.

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clean screen, or you must open a split or alternate screen.) The list of files will appear in the area normally occupied by text, and a temporary file called DIRECTORY.TMP will be created. This file can be saved, printed, or used like any other text file. The directory display and the temporary file will disappear automatically when you call up any other file.

The best part, however, is that by parking an ERASE, TYPE, or CALL command on the command line and moving the cursor around the directory, you can select any file for printing, editing, or eras-

ing. Erased files are immediately removed from the screen directory, which makes house-cleaning directories a snap. With a hard disk and many subdirectories, you can move to any of them and repeat the process.

There are many more attributes to XyWrite. The best way to discover them all is to try the program yourself. I think you'll be impressed. ■

Peter H. Weil is engaged in the practice of law as a member of a large New York City law firm, where he is also in charge of the firm's EDP and automation activities.



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```
LIST
10 REM #---ACR0010---
20 REM #---CUSTOMER NAME AND ADDRESS LOAD PROGRAM---
30 DIM B$(15)/DIM C$(20)/DIM D$(30)/DIM E$(10) = "Z"
40 J=0:OPEN #1: "CUSTWST.Z"
50 #1=OPEN #1
60 GOSUB 400
70 H=0
110 H=0
120 IF LAST CUST # ENTERED WAS "F" . AS . BS
130
140 TO END PROGRAM ENTER H999 AT CUST #
150 J=J+1
160 IF ENTER FOLLOWING
170 GOSUB 520
180 INPUT CUT # F
190 IF F=9999 THEN 490
200 IF F=N THEN 220
210 N=F/1000 240
220 IF SEQUENCE ERROR-RETYPE
230 GOTO 160
240 INPUT LST NAME AS(1,8)
250 IF AS=999 THEN 300
260 INPUT LST NAME BS(1,15)
270 IF BS(1,2)=AS(1,2) THEN 300
280 INPUT ADRS LNM C$(1,20)
290 IF C$(1,2)=AS(1,2) THEN 300
300 INPUT ADRS LNM D$(1,20)
310 IF D$(1,2)=AS(1,2) THEN 300
320 INPUT TEL # E$(1,8)
330 IF E$(1,2)=AS(1,2) THEN 300
340 INPUT MO PNT AMT J
350 IF J=999 THEN 300
360 GOSUB 420
370 GOTO 150
380 H=H+1
390 GOTO 170
400 READ #1:WVAL J: F AS BS C$(1,2) E$(1,8)
410 RETURN
420 WRITE #1:WVAL J: F AS BS C$(1,2) E$(1,8)
430 K=0:G=J
440 WRITE #1:WVAL J: F AS BS C$(1,2) E$(1,8)
450 RETURN
460 J=0
470 GOSUB 420
480 GOTO 140
490 REM #---CLOSE ROUTINE---
500 CLOSE #1
510 END
520 C$(1,20)=" "
530 E$(1,8)=" "
540 RETURN
```

Basic

```
ACCOUNTS RECEIVABLE is a file
1 Use CUSTOMER NUMBER
2 and CUSTOMER NAME
3 and ADDRESS
4 and CITY STATE ZIP
5 and TELEPHONE NUMBER
6 and MONTHLY PAYMENT AMOUNT

ADD TO CUSTOMER FILE is a verb
1 and INPUT What is the customer number?
2 and INPUT CUSTOMER NUMBER
3 and MESSAGE What is the customer's name?
4 and INPUT CUSTOMER NAME
5 and MESSAGE What is the street address?
6 and INPUT ADDRESS
7 and MESSAGE What is the City State and Zip Code?
8 and INPUT CITY STATE ZIP
9 and MESSAGE What is the customer's phone number?
10 and INPUT TELEPHONE NUMBER
11 and MESSAGE What will the customer pay monthly?
12 and INPUT MONTHLY PAYMENT AMOUNT
13 and SAVE BY CUSTOMER NUMBER in the ACCOUNTS RECEIVABLE
14 and REPEAT
```

plain english

```
IDENTIFICATION DIVISION
PROGRAM--IS
TEST
ENVIRONMENT DIVISION
CONFIGURATION SECTION
SOURCE--COMPUTER RMC
OBJECT--COMPUTER RMC
INPUT--OUTPUT SECTION
FILE--CONTROL
SELECT AR--MASTER ASSIGN TO RANDOM /u/Wee/arnest
ORGANIZATION IS INDEXED
ACCESS MODE IS DYNAMIC
RECORD KEY IS CUSTOMER--NUMBER
DATA DIVISION
FILE SECTION
FD AR--MASTER LABEL RECORDS ARE STANDARD
01 AR--REC PIC X(4)
05 CUSTOMER--NUMBER PIC X(20)
05 CUSTOMER--NAME PIC X(40)
05 CUSTOMER--ADDRESS PIC X(40)
05 CUSTOMER--CITY--STATE--ZIP PIC X(40)
05 CUSTOMER--PHONE PIC X(10)
05 CUSTOMER--PAYMENT--AMOUNT PIC X(50)
WORKING--STORAGE SECTION
RESIDENT SECTION 1
STAR--UP
OPEN OUTPUT AR--MASTER
LOOP
DISPLAY ENTER CUSTOMER NUMBER OR TO EXIT
ACCEPT CUSTOMER--NUMBER PROMPT
IF CUSTOMER--NUMBER = GO TO END--OF--JOB
DISPLAY ENTER CUSTOMER NAME
ACCEPT CUSTOMER--NAME PROMPT
DISPLAY ENTER CUSTOMER ADDRESS
ACCEPT CUSTOMER--ADDRESS PROMPT
DISPLAY ENTER CUSTOMER CITY STATE ZIP
ACCEPT CUSTOMER--CITY--STATE--ZIP PROMPT
DISPLAY ENTER TELEPHONE NUMBER
ACCEPT CUSTOMER--PHONE PROMPT
DISPLAY ENTER CUSTOMER PAYMENT AMOUNT
ACCEPT CUSTOMER--PAYMENT--AMOUNT PROMPT
WRITE AR--REC INVALID KEY GO TO BAD--ADD
DISPLAY CUSTOMER RECORD SAVED
GO TO LOOP
BAD--ADD
DISPLAY INVALID CUSTOMER
GO TO LOOP
END--OF--JOB
CLOSE AR--MASTER
STOP RUN
```

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IBM Goes UNIX

In a bid to steal AT&T's thunder, IBM has announced its own version of UNIX—PC/IX. PC's special report on UNIX continues with first-hand looks at IBM's product and three other UNIX-like operating systems.

AT&T has entered the computer marketplace and everyone expects a war between the big guys, IBM and AT&T. So who would have expected that IBM would market an AT&T product? When the product is the venerable UNIX operating system from AT&T, though, it's not too surprising.

At the UniForum '84 convention for UNIX buffs last January in Washington, D.C., IBM formally announced the Personal Computer Interactive Executive (PC/IX), a single-user version of UNIX System III for the PC-XT. The transfer of UNIX to the PC was done by Interactive Systems Corporation. IBM's marketing efforts for PC/IX are being directed from the company's National Accounts and National Marketing divisions.

PC/IX should be available by the time you read this review. It will cost \$900 and require an XT or an equivalently equipped PC. Its enhancements of UNIX III include functions to read/write PC-DOS disks, a full-screen editor, and support for PC-compatible peripheral devices.

As I write this, IBM has not yet released PC/IX, so it refused to provide a review copy. In order to try PC/IX, I had

to fly to the IBM office in Dallas to attend a PC/IX review session.

Upon arriving, I was told that the session was not until the following week and that none of the equipment was set up. After some negotiating with an IBM representative, I was able to obtain the use of an XT and a copy of PC/IX.

Normally, when I review a piece of software, I run it three times. First, I install it according to the manual, try it out, and get a feel for how it works. I make sure all of the advertised features are there and mull this over for a while. Then I re-install the program and crash-test it (try to make it malfunction). Finally, a few days later, I do performance and ease-of-use checks.

This review process generally takes 30 hours over the course of several weeks. It is performed on my own system, with all of my test programs, hardware (letter quality and dot matrix printers, color and monochrome displays, modems, different floppy sizes, and so on). For PC/IX, I had just 2 days in a foreign environment with incomplete documentation, no library, and nothing but a PC-XT, an IBM graphics printer, and a monochrome display.

Consequently, this review is limited to



my impressions from a very rushed session with a system that was not quite ready for release. Some PC/IX features take more time to set up than I had available. Others were untestable under the circumstances (for example, graphics and communications). I can only report on what I had time to discover and what was documented.

PC/IX as UNIX

PC/IX is certainly a UNIX system. It contains nearly all of the single-user facilities of UNIX System III, without the Berkeley enhancements. The file structure and system calls are standard AT&T UNIX, as is the user documentation.

There are, as far as I could tell, no missing commands except for `f77` (FORTRAN), and multi-user specific commands.

I tried perhaps 40 percent of the system's programs and facilities (see sidebar, "PC/IX Features" for a partial list). Everything except the debugger (`adb`) worked fine. (The debugger documentation was a travesty, which may explain why I could not make it work.) I was not able to try out the communications facilities (both `connect` and `uucp`) and the

SCCS, `tplot`, `bs`, `yacc`, `awk`, and `snd` features.

PC/IX is advertised as requiring 256K of memory, at least one 10-megabyte hard disk (XT or PC expansion type only), and an IBM display adapter. The XT I used had 512K, a recommended lower limit for better performance. Installation requires a double-sided disk drive.

The installation instructions were very detailed. PC/IX can co-exist with PC-DOS on the hard disk (it uses the same partitioning scheme as `FDISK`) so you may not need to reformat your hard disk. The instructions were a bit murky, but not opaque, with regards to partitioning. Installation took about 20 painless minutes.

It looked to me as if PC/IX will run only on IBM PCs or very similar compatibles. The full-screen editor does its own keystroke decoding and uses the memory-mapped video display. The printer output appears to be interrupt-driven (hence hardware-dependent), and support for non-IBM peripherals (except for the support standard to the UNIX) was nonexistent. There is no `termcap` file, and thus no support for foreign terminals since PC/IX is a single-user implementation for the PC.

PC/IX comes with an `stty` command that, like the DOS 2.0 `MODE` command, alters peripheral setup (switching display adapters or setting baud rates, for example). Also included are the `dosread`, `doswrite`, `dosdel`, and `dosdir` utilities for transferring files between DOS and PC/IX.

The screen is controlled by escape sequences equivalent to the ANSI.SYS definitions on DOS 2.0. This lets you control screen colors and positioning using escape sequences.

Support for the IBM keyboard, including the function keys, was completely missing from PC/IX. Also lacking was a provision for a clock with a battery backup, or any other outside vendor add-on such as higher-resolution graphics, smarter printers, different floppy formats and higher-capacity hard disks.

Also irritating was the occasional lack of type ahead capability, that is, the ability to continue typing while a command is thinking. I'm not sure whether some routines swallowed the type ahead capability, since it seemed to come on sporadically. This may be just a bug that will be corrected by the time the system is released.

Like DOS, PC/IX contains a prompted deletion function and a directory lister (similar to the DOS command DIR). The print spooler is called print and it seemed to have a bug or two also.

Documentation

IBM claims that it will have new and better documentation available by the time the public release of PC/IX rolls around. I hope so, because the documentation I saw

but not nearly enough. The UNIX on-line manual creation (man) feature has no manuals to create in PC/IX, so it is of little use.

IBM's documentation is generally excellent, but PC/IX shows an alarming lack of novice-level documentation. Based on what I saw, I would hesitate to recommend the system for anyone but experienced computer users who have some time on their hands.

The documentation I saw was, in a word, skimpy. It consisted primarily of not very well organized excerpts from standard UNIX documentation.

was, in a word, skimpy. It consisted primarily of poorly organized excerpts from standard UNIX documentation.

The C compiler had two pages of documentation, as had one (note that as does not use Intel/PC-DOS mnemonics), and the Source Code Control System (SCCS) seemed to have no documentation at all. The lack of adequate documentation severely handicapped my testing. On-line documentation should be mandatory. Error messages were typical of UNIX: pithy and too short.

Unlike most UNIX implementations, standard documentation on writing and installing device drivers was included in PC/IX. Whether the final version of PC/IX will include this documentation remains to be seen, since it makes it easier to add additional users to what is supposed to be a single-user system. Removing that documentation would negate one of the things that made the PC so popular, namely its ability to interface with non-IBM products.

There was a readable user's guide, with some discussion of utilities (primarily troff and nroff). An on-line help command was supplied with a few files,

Text Processing

Text processing under UNIX falls into two categories: editing and formatting. Editing is the process of creating and altering text. Formatting takes a finished manuscript and makes the output suitable for a specific printer.

PC/IX's sophisticated text formatting includes both nroff and troff, nroff is a text formatter much like SCRIPT (a mainframe formatter) and WORDIX (a PC-DOS formatter). It contains the ability to produce tables of contents, footnotes, macro definitions, conditional input from the keyboard, various justification methods, and more.

The troff function adds the ability to produce output suitable for a specific typesetting machine, in this case the Graphics Systems CAT phototypesetter. This includes the capability to specify a number of different fonts, character sizes, and spacings.

Preprocessors, such as eqn and ms, work with nroff and troff to create scientific papers and manuscripts.

Although nroff seemed to work, the implementation did not take full advantage of the IBM graphics printer (not to mention more advanced multiple-font printers available for the PC). And troff produces output suitable only for one particular phototypesetter. Similarly, the nroff preview function showed only some of the formatting elements on the screen (for example, underlines were indi-

PC/IX Check List

Here's a quick way to check those commands and facilities that can be found in both UNIX and PC/IX.

- The nroff and troff text formatters. eqn, neqn, tbl, ms, and mm manuscript production tools.
- The SCCS source code control system. The ed, sed, diff, and diff3 text processors.
- The uucp file transfer program, (the uux networking function seems to be present).
- The lex, yacc, m4, and awk language processors.
- A C compiler, bs (a version of BASIC), as (an 8086 assembler), and sno (a version of SNOBOL) on the PC.
- The spell spelling checker.
- The man utility and the Help command (but little on-line documentation).
- Standard UNIX file commands, with multi-user access control, and multiple accounts. (I suppose so more than one person can use a single XT nonsimultaneously.)
- A full-screen editor, commonly called INed, with windows and PC keyboard support.—M.Z.



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PC/IX's text editor is far more sophisticated than those available on most mainframes and UNIX implementations, yet more primitive than many popular PC-DOS editors.

The INed full-screen editor comes with a keyboard overlay and a number of boilerplate forms. The overlay is an absolute necessity since INed completely redefines the keyboard (in a rather arbitrary fashion). For example, to get most functions to work, you need to hit the "execute" key, the gray plus sign (+). The Ins and Del keys do not insert and delete, while Alt/Ctrl commands are barely mnemonic.

INed does let you run any program while it is working, which is nice for checking results or doing arithmetic. It also has the ability to manipulate two windows (although this takes a great deal of effort). Unfortunately, the documentation occasionally contradicted the program, and block operations neglected to intensify the screen. Cut and paste operations took a little getting used to, and other UNIX implementations seemed superior in this respect.

INed always does line wrap and it does not allow lines over 80 characters long. Scrolling was slow, as was cursor movement. Often the PC would beep for no discernible reason. This is not a quiet office editor.

Finally, INed has six lines of status indicators and markers, including a useless box around the text, so only 19 lines of usable area are left. I would rather have had more text and less extraneous information. At least the on-line help was easy to access and usually helpful.

Don't get me wrong. I would use INed over a number of editors I can name. It makes use of much of the PC keyboard, albeit improperly, to save keystrokes. Further, since the display is direct to memory, screen updating is quick and efficient compared to an external terminal. Finally, INed intelligently uses the PC's extended character set for help messages and status

display. I did not have sufficient time to delve into INed completely and I realize that it was clearly unfinished. Interactive Systems, for example, touts INed's ability to work with structured files, but the documentation does not explain what they might be.

Languages

PC/IX comes with a variety of languages. These include a C compiler, an assembler, a near-BASIC interpreter, and a near-SNOBOL interpreter. The only

PC/IX's text editor is far more sophisticated than those available on most mainframes and UNIX implementations.

ones I had time to try were the C compiler and the as assembler.

The C compiler is the standard UNIX compiler. It produces either object code or intermediate assembly source code (for processing by as). The documentation was so skimpy that it was tough to get started in C, but after a few false starts it ran smoothly.

To a person accustomed to PC-DOS, the code the compiler produced is surprisingly compact. For example, simple "Hello, World" programs produce object files of less than 1,000 bytes (as opposed to about 10K on PC-DOS). The reason for this terseness seems to be that since UNIX is written in C, most C subroutines are already in memory, so they are called directly. Also, all I/O processing is provided by PC/IX.

Not realizing that PC/IX could transport files from PC-DOS disks, I neglected

to carry along my timing programs. So, to get a feeling for optimization, I took a look at the assembly output. The C compiler seemed to produce a straightforward translation of C source to assembler, with no optimization. PC/IX does include the profiler utility for timing subroutine calls. The profiler can be disabled during compilation for speedier results. The system includes an optional 8087 floating point support. System calls seem to contain the full UNIX System III set.

The PC/IX as assembler uses an undocumented gibberish code. It seemed to have far fewer features than the IBM Macro Assembler does.

I was not able to test it, but bs (BASIC) was said to be similar to cassette BASIC in capability, with no graphics support and no full-screen editor. It supposedly has structured constructs and general process I/O (pipes).

Summary

The SCCS, lint, profiler, ob, make, and multitasking facilities make PC/IX a good working environment for C code programmers. INed, with nroff and troff, is a strong manuscript preparation facility. Spreadsheets and database managers are missing, but both are available for UNIX from non-IBM sources.

Except for the INed editor, this is a plain-vanilla UNIX System III implementation for the IBM PC. Keyboard and video support are marginal, but functions are provided for communications with PC-DOS disks and for partitioning the hard disk. PC/IX is strictly a single-user implementation. It supports multitasking, not multiusers. If the support routines are of enough interest, then PC/IX could be worth the sacrifice of the half of a hard disk it takes up.

Based on my limited review of an early, prerelease version of PC/IX, I would recommend that novices stick with PC-DOS for its superior documentation, simpler command syntax, better keyboard support, and stronger and cheaper commercial software library. ■

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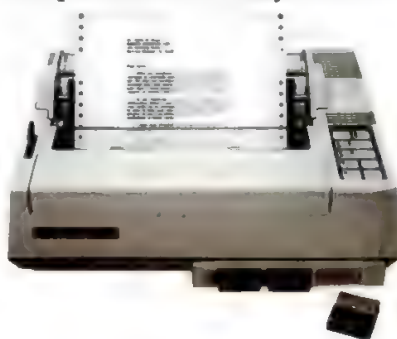
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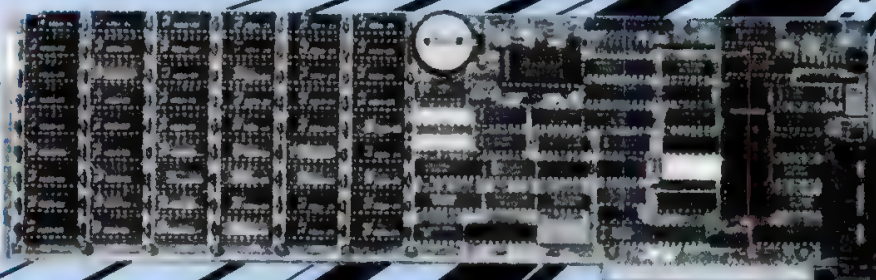
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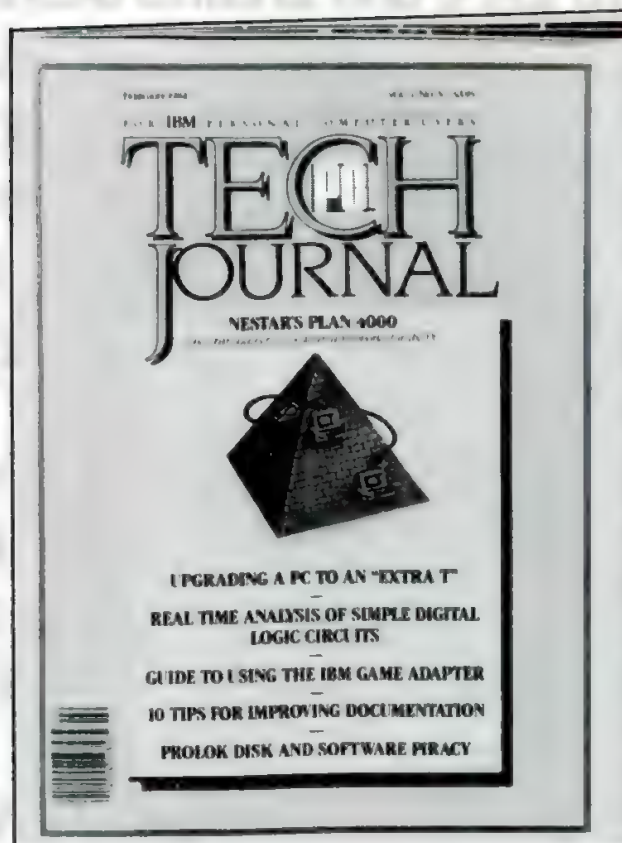
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Windows on UNIX

Although uNETix offers a multiple windowing environment at low cost, its prerelease version has two major windows of vulnerability: slow speed and lack of hard-disk support.

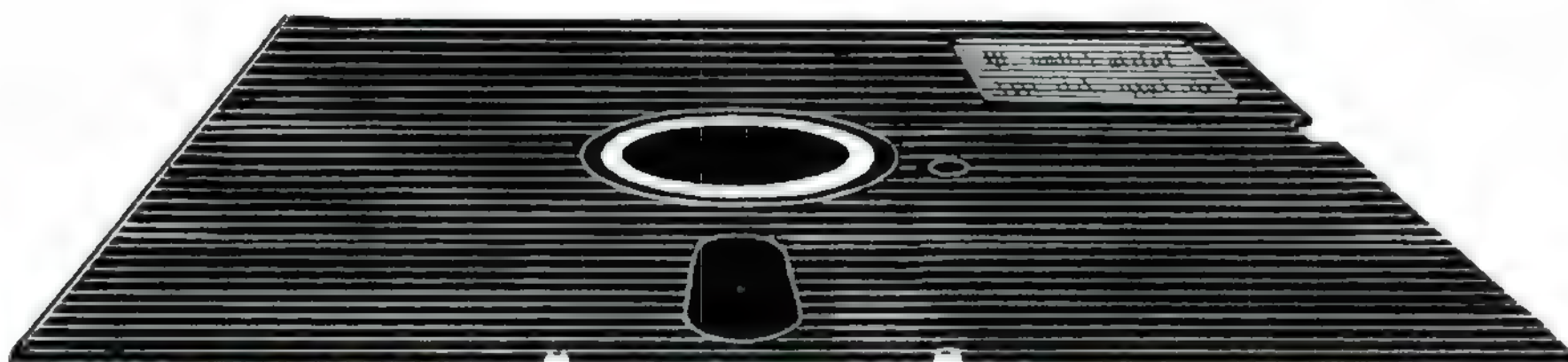
Predictions about the incorporation of multiple window management into the powerful multitasking UNIX environment have already become dated by the rush of events in the software development industry. Nevertheless, UNIX users who are accustomed to having only the stark shell prompt stare at them from their monitors will be pleasantly surprised by the uNETix Operating System developed by Lantech Systems of Dallas. Up to 10 user-defined windows with different foreground tasks in each provide a friendly and powerful environment for UNIX operations. And users with color monitors have the added delight of being able to define separate colors for the background and foreground of the windows and their borders. So far, this is the first window management package I know of for any microcomputer that offers separate, full background and foreground colors for each window.

uNETix comes with two distribution diskettes, a "kernel" system disk used for bootup, and a file system disk on which most of the action occurs. The accompanying *Programmer's Guide* is generally complete and written in a style that is accessible to the inexperienced user.

Standard uNETix features include foreground and background multitasking, windowing capabilities, a PC-DOS emulator that features DOS commands and allows you to run DOS programs, data transfer between windows, a terminal emulator, and a software development kit that features an assembler, linker, loader, and librarian. The optional C compiler, Lantech claims, was the first available for the 8086/8088 and has been used by many top software development houses.

uNETix is a UNIX workalike that has been written "from scratch" without using the source code from AT&T. The absence of a licensing fee means that Lantech can offer it at a surprisingly low price. As its name implies, Lantech is involved with local area networks (LANs) and has designed uNETix to be especially suitable as a network operating system intended for "standalone" use on a "limited-resource personal workstation." uNETix is fitted with an "intelligent switch" designed for use in controlling various configurations of serial devices. Its special adaptation to the LAN environment, however, does not tell the full story.

Generally, uNETix commands are compatible with UNIX Version 7. The



command structure is considerably closer to a standard UNIX command shell than that of Quantum Systems' QNX, for instance. Most of the UNIX Version 7 commands and system calls are supported, with the following exceptions: *acct*, *chown*, *chroot*, *environ*, *indir*, *lock*, *mpx*, *phys*, *pkon*, *profil*, *ptrace*, *times*, *umask*, and *utime*.

The uNETix File System

Despite differences in the shell prompt, which in uNETix is the number symbol (#) instead of the more familiar percent sign (%) or dollar sign (\$), the file hierarchy looks and responds like any other UNIX system. Everything is either an ordinary file, a special file, or a directory file. Windows, for example, are classified as special files. Let's take a quick tour of the uNETix file system as it appears on the evaluation copy (pre-release version 0.97).

If you immediately enter *ls* (for *list short*) in response to the shell prompt right after the system boots, uNETix displays the following root directory (the comments explaining each, of course, are not listed):

<i>bin</i>	(The binary source for the most commonly used commands)
<i>dev</i>	(The devices currently supported)
<i>etc</i>	(Binary source for less commonly used commands)
<i>mnt</i>	(The directory for mounting the B disk drive)
<i>tmp</i>	(Used for temporary files created by the system)
<i>wave</i>	(A demo program to scroll Lantech's logo in windows)

This listing gives the main directories in the uNETix file system. To get further details about these main file branches, you simply ask for the long list of the root directory by entering:

```
# 1
```

which will give you the more complete information found in Figure 1.

To move deeper into the hierarchy and look at the *bin* directory, as with any UNIX, you enter

```
# cd bin
# ls
```

Figure 2 shows the listing that results, and

Figure 3 gives the long listing. (The *colorwin* file in Figure 1 is a shell program I wrote to save the color settings of windows; it doesn't come on uNETix.)

Local Color

The multiple windowing capability of uNETix is spectacular, with its options for setting the colors of the foreground and background of each window and each window's border. User control of window configuration functions is defined through the keyboard so deftly that the command-key layout never becomes burdensome or confusing.

Like much of the window management software for the PC, uNETix uses the Alt-W key combination to toggle into the Window Management mode, which turns on the function keys for a selection of window control operations. The function keys actually select different ways that the cursor control keys can change window attributes in a given direction. F1, for example, allows you to use the arrow keys to scroll or pan through a window in any of the four directions. As you do, the current line and column numbers are incremented on the status display at the bottom of the screen. When you come to the edge of a


```
total 9
drwx----- 1 uNETix      0 Feb  6 1984 16:13 bin
-rw----- 1 uNETix    437 Feb 24 1984 18:27 colorwin
drwx----- 1 uNETix      0 Feb  6 1984 16:13 dev
drwx----- 1 uNETix      0 Feb  6 1984 16:13 etc
drwx----- 1 uNETix      0 Feb  6 1984 16:13 mnt
-rwx----- 1 uNETix  10752 Feb 10 1984 11:31 scroll
drwx----- 1 uNETix      0 Feb  6 1984 16:13 tmp
-rwx----- 1 uNETix  11008 Feb  9 1984 17:32 wave
```

Figure 1: The root directory long list.

window, a beep notifies you that you can't go any farther in that direction.

The F2 key sets the cursor keys to move the chosen window right across the screen in the direction of the arrow. F3 allows the window to be expanded in the arrow key's direction, while F4 designates the opposite function, contraction. For both of these last two modes, the Home key produces an expansion or contraction in all four directions at once. uNETix also includes *color*, an impressive program that provides a simple menu-driven method for you to set the color attributes of the windows, their borders, and the status line. After you type in the word *color*, a display comes up with patches of color for both foreground and background. All you have to do is move the cursor to the color patch you want and type in the number of the window whose color you want to set. Immediately your choice is recorded on a multicolor grid that shows both the foreground and background colors of any window at a glance. This excellent arrangement is user-considerate, a feature which the UNIX environment certainly needs.

Emulating PC-DOS

To compensate for the dearth of user-oriented software in the UNIX environment, Lantech provides a program under uNETix that not only supports DOS commands like DIR and COPY but that runs DOS programs and provides some file transfer capability. So far, however, only DOS 1.1 formatted disks will run under the emulator, though certain DOS 2.0

commands, such as ASSIGN, ECHO, and PAUSE, are supported, as are I/O redirection and piping. Four additional commands, FREEMEM, MAXSIZE, MINSIZE, and QUIT, are used in the emulator operation.

To use the DOS emulator, you first have to go to window 0, the full-size console window. You insert a DOS 1.1 for-

```
total 35
-sh                  sleep
cat                  suspend
chmod                tee
cmp                  vtty
color                wc
cp
cpdos
date
displaydt
echo
ed
emulator
kill
l
ln
lpr
ls
mkdir
mv
mvdos
nice
od
paint
pcdos
pr
ps
resume
rm
rmdir
sh
```

Figure 2: The bin directory.

matted disk in drive B and respond with *pcdos* to the shell prompt. uNETix responds with a prompt to tell you what it's doing, reminds you to put your DOS disk in drive B:, and waits for a carriage return to proceed. When you have again responded, a long warning message appears to inform you that the emulator now considers the drive with the DOS disk in it as drive A: and that the uNETix disk in the drive formerly regarded as A: must not be removed for any reason while the emulator is running. Finally, you are asked to give another carriage return when you are ready. When you have done so, uNETix tells you the emulator is being loaded. When the familiar A> prompt appears, the DOS emulator is ready for action.

My test of the DOS emulator using a number of DOS 1.1 formatted programs ran with no omissions of features and no problems during the programs' operations. They all ran substantially slower than normal, however. An important feature is that the window transfer key commands remain in effect while a DOS program is running so that any time you wish, you may go to one of the other uNETix windows and issue any shell commands and carry on a normal uNETix session without disturbing the DOS program. The one exception is that uNETix windows do not operate when the DOS program is in the Graphics mode, so unless you want a little display in abstract psychedelic computer art, you better not leave the DOS window until after the program has returned to the Text mode. However, if for any reason you do exit the window in the Graphics mode, (assuming the program you are running allows you to), you can switch back to the Text mode again and things will return to normal.

The DOS emulator extends your ability to manipulate data through a file transfer option. Information can be transferred between uNETix and PC-DOS programs in three ways:

- A "front-door" transfer that uses what uNETix calls the Self-Integration feature

to easily move data from one window to another;

- A "back-door" transfer from within the DOS emulator that uses the COPY command to transfer a complete file;
- A "back-door" transfer from within uNETix that uses the cpdos or mvdos commands to transfer complete files.

The front-door transfer works like this: First you have to prepare the destination window to receive data, for instance, by placing the editor ready and waiting in the Append or Insert mode in the destination window. Next you go to the source window, which contains the information you want to transfer, enter the Window Management mode, and hit the F6 function key. At this point, you are able to highlight the information to be transferred in reverse video. To do so, locate the cursor in the upper left corner, hit the F7 key, move the cursor to the lower left corner, and again hit F7. When you are satisfied that the right information is highlighted in reverse video, you select the destination window, hit the F8 key, and the transfer begins.

The back-door file transfer from within the DOS emulator is simply a matter of issuing the COPY command and specifying the proper file name options. You can use it to copy DOS files to uNETix and vice versa. Source and destination files can be entirely within either DOS or uNETix or divided between them.

The back-door file transfer from within uNETix makes use of the cpdos command or mvdos, which actually moves the file and erases the original. Both of these commands are only for transferring files from the DOS to the uNETix environment. From this it might seem that uNETix and DOS are now fully integrated for every type of interaction between them you might ever need, but this is unfortunately not the case. Data transfer between windows does not permit front-door transferring of data from DOS programs to the uNETix environment. Also, the transfer of a file from one operating system environment to the other does not ensure that it

total 35											
-r-x-----	1	uNETix	12953	Feb	5	1984	16:19	-sh			
-r-x-----	1	uNETix	668	Feb	6	1984	16:14	cat			
-r-x-----	1	uNETix	917	Feb	5	1984	16:14	chmod			
-rwx-----	1	uNETix	6144	Feb	6	1984	16:14	cmp			
-rwx-----	2	uNETix	14976	Feb	6	1984	17:31	color			
-r-x-----	1	uNETix	2288	Feb	6	1984	16:15	cp			
-r-x-----	1	uNETix	319	Feb	5	1984	16:15	cpdos			
-r-x-----	1	uNETix	4357	Feb	6	1984	16:15	date			
-rwx-----	1	uNETix	1408	Feb	5	1984	16:15	displayd			
-r-x-----	1	uNETix	533	Feb	5	1984	16:15	echo			
-r-x-----	1	uNETix	21141	Feb	6	1984	16:15	ed			
-rwx-----	1	uNETix	61952	Feb	9	1984	11:46	emulator			
-r-x-----	1	uNETix	4190	Feb	6	1984	16:16	kill			
-r-x-----	1	uNETix	5629	Feb	6	1984	16:16	l			
-r-x-----	1	uNETix	2288	Feb	6	1984	16:16	ln			
-rwx-----	1	uNETix	1595	Feb	6	1984	16:16	lpr			
-r-x-----	1	uNETix	5629	Feb	5	1984	16:16	ls			
-r-x-----	1	uNETix	3748	Feb	6	1984	16:16	mkdir			
-r-x-----	1	uNETix	2288	Feb	6	1984	16:16	mv			
-r-x-----	1	uNETix	351	Feb	6	1984	16:16	mvdos			
-r-x-----	1	uNETix	1408	Feb	6	1984	16:16	nice			
-rwx-----	1	uNETix	5120	Feb	6	1984	16:16	od			
-rwx-----	2	uNETix	14976	Feb	6	1984	17:31	paint			
-r-x-----	1	uNETix	4224	Feb	6	1984	16:17	pcdos			
-rwx-----	1	uNETix	12288	Feb	6	1984	16:17	pr			
-r-x-----	1	uNETix	4485	Feb	6	1984	16:17	ps			
-r-x-----	1	uNETix	739	Feb	6	1984	16:17	resume			
-r-x-----	1	uNETix	1178	Feb	6	1984	16:17	rm			
-r-x-----	1	uNETix	1178	Feb	5	1984	16:17	rmdir			
-r-x-----	1	uNETix	12953	Feb	6	1984	16:17	sh			
-rwx-----	1	uNETix	640	Feb	6	1984	16:17	sleep			
-r-x-----	1	uNETix	1280	Feb	6	1984	16:17	suspend			
-rwx-----	1	uNETix	768	Feb	6	1984	16:17	tee			
-rwx-----	1	uNETix	16481	Feb	6	1984	17:31	vtty			
-rwx-----	1	uNETix	13440	Feb	6	1984	16:19	wc			

Figure 3: The bin file long list.

will be usable in that environment. Text files, of course, present no problems. Importing compiled object files, however, is a different story.

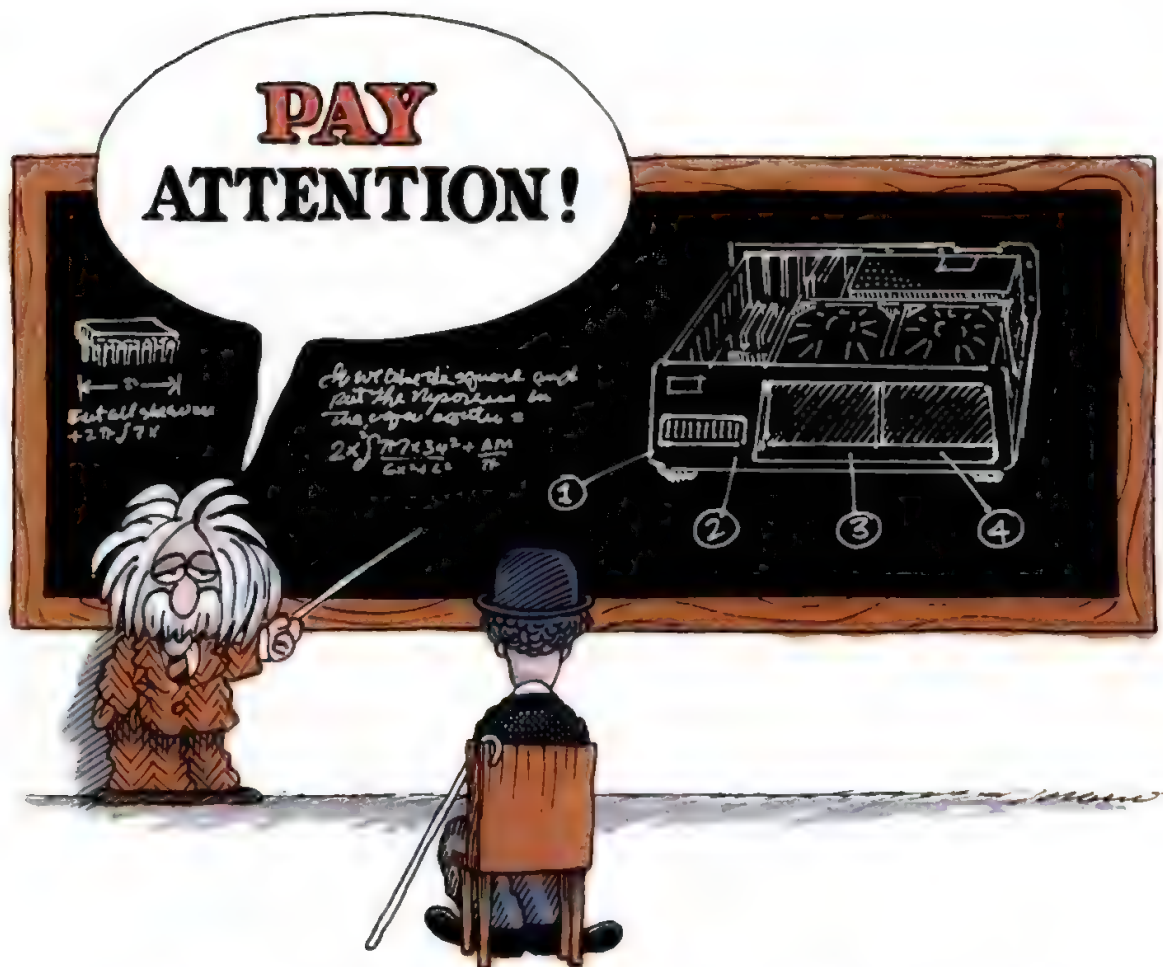
Editing Files

The uNETix editor operates as a line editor in two modes, the Append mode and the Edit mode. It can be opened in any window by typing ed followed by the name of either an existing or a new file. If it is a new file name, uNETix answers "cannot find" and gives you the editing prompt >. From here you can either answer with the letter a for the Append mode or the letter e for the Editing mode.

The Append mode is good for begin-

ning a new file or for adding something to the end of an existing file. For anything else, use the Edit mode. The Editing mode places several powerful and complex commands at your disposal. To instruct the editor to print any line, you simply type the line number followed by the letter p. To tell the editor to display line 5, the command is 5p. If you don't know the line number, then you can search a file for the presence of a line with a specified string. At the end of a successful search, the line and its number will be displayed.

The other main editing commands are i for insert, d for delete, and s for substitute. The format for inserting text is /string/i, which allows you to start



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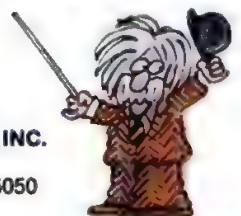
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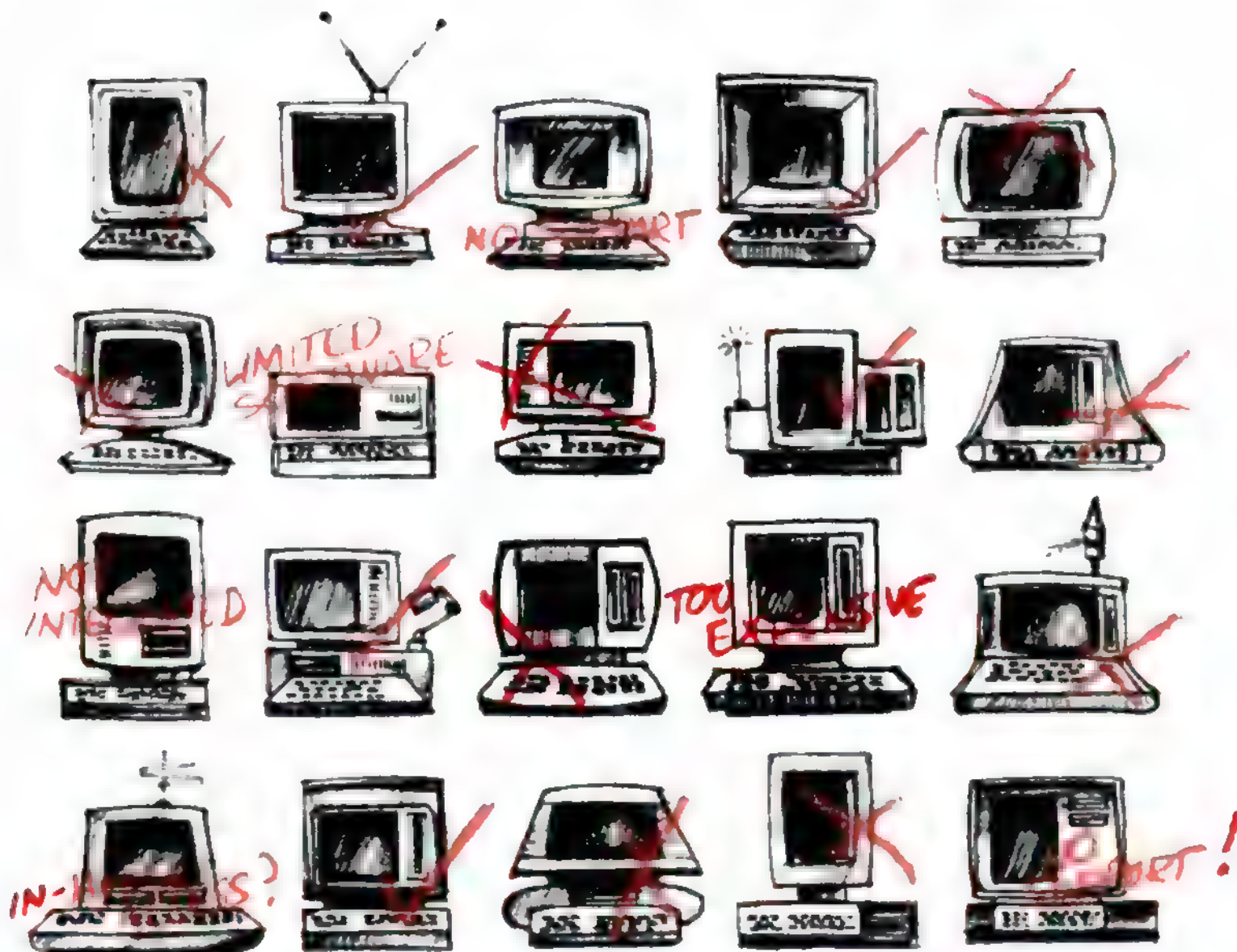


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UNIX and UNIX-Like Operating Systems

NAME	COHERENT (Version 2.3)	PC/IX	uNETix (prerelease version .97)	VENIX/86
MANUFACTURER ADDRESS TELEPHONE NUMBER	Mark Williams Co. 1430 W. Wrightwood Ave. Chicago, IL 60614 (312) 472-6659	IBM If currently an IBM customer, see local marketing representative, visit IBM Product Center, or write to: IBM Dept. 62/15-07-80, 220 Las Colinas Blvd. P.O. Box 2750 Irving, TX 75062.	Lantech Systems 9861 Chartwell Dr. Dallas, TX 75243 (214) 340-4932	Unisource Software 71 Bent St. Cambridge, MA 02141 (617) 491-1264
PRICE NUMBER OF DISKETTES	\$500 7	None given \$900 19	\$454.85 2	Single user, \$800; Multi-user, \$1,000 11
TYPE OF SYSTEM Similarity to UNIX Multitasking? Multi-user?	UNIX-like Yes Yes	Licensed implementation of UNIX System III Yes No	UNIX-like Yes No	Licensed implementation of UNIX Version 7 Yes Yes, up to 2 additional users
MINIMUM CONFIGURATION Number of drives Hard disk Partition size Amount of memory	1 Required 2.5MB 256K	1 10MB required 3MB 256K	2 Not supported Not applicable 256K to do a single task in 1 window	1 Required 3.5MB 128K for operating system only
SUGGESTED CONFIGURATION Number of drives Hard disk Partition size Amount of memory	1 Required 2.5MB 256K	1 10MB required 7MB 512K	2 Not supported Not applicable 512K for full multitasking in 10 windows	1 Required 3.5MB 256K
INSTALLATION Time required to install Ease of installation	15 minutes Easy	20 minutes Easy	15 minutes Easy	45 minutes Good method, but tedious
DOCUMENTATION Number of manuals Clarity Completeness Ease of use Tutorials	11 Excellent Excellent Easy to use Good, with amusing examples	5 Pre-release version disorganized Skimpy, but may be improved Pre-release version too terse Yes	1 Good Good Accessible to novice users Yes	5 Good Excellent Good For VT, LEX, and the C compiler

PC-DOS COMPATIBILITY Utility to transfer data to and from DOS? Extent of compatibility	Yes Low	Yes Can co-exist with PC-DOS on the hard disk	Yes Has PC-DOS emulator within uNETix, limited to DOS 1.1 formatted disks	Yes Can partition hard disk to leave one partition (2.5MB) free for PC-DOS
SHELL Characterization	Has pipes and flow-of-control commands; allows background processing	No Berkeley enhancements	10 user-defined windows handling different foreground tasks, will handle color	Berkeley C shell
C COMPILER How closely does it adhere to Kernighan and Ritchie standard? Floating point support? Standard I/O library? Allows look at preprocessor output?	Closely Yes Yes Yes	Closely Yes Yes Yes	C compiler not available Not applicable Not applicable Not applicable	Closely With 8087 chip Yes Yes
OTHER COMPILERS	None	No, but has BASIC interpreter, SNOBOL interpreter	No	No
UTILITIES List current tasks List active users Check disk for errors	Yes Yes Yes	Yes No Yes	No Not applicable Yes	Yes Yes Yes
FILE MANAGEMENT Upload/download capability?	No	Yes	Optional	Yes
TEXT HANDLING Line Editor Screen Editor	Yes, ED No	Yes Yes, INed	Yes No	Yes Yes
PERFORMANCE Speed Extent of bugs	Adequate A few minor ones	Good Impossible to determine under circumstances	Somewhat slow Lacks robustness; tends to crash when user does something in an unexpected way	Adequate Moderate number of unimportant bugs

The uNETix programming environment is defined by a full set of professional programming tools.

entering text at any point before the next line where the specified string occurs. Typing `i` allows you to insert text before whatever is the current line, and a command such as `i7` starts the text insert just before line 7.

The delete command works in a similar way. Just entering the letter `d` deletes the current line, while `d6` deletes line 6. The substitute command is a convenient and easy way to manipulate text within lines. The command `s/always/Always/` will capitalize the word *always* if it is in the current line. The command `4s/this/this /` inserts a space after *this*. Actually, the substitute command can work on a sequence as short as two characters, as long as they are unique on the line. So `s/ig/ing/` will edit the line

```
Nothig more is needed
to read
```

```
Nothing more is needed
just as s/dr "/d, "/" suffices to
replace
```

```
"Enough!", he saidr
"Enough!"
```

with

```
"Enough!", he said,
"Enough!"
```

On the other hand, `s/ni/nig/` will change

```
Toniht's the night.
to read
```

```
Tonight's the nigght.
```

As you can see, this line editor, while

far from being as convenient as a full-screen editor, is well designed. As line editors go, it is one of the most powerful and easy to use I have seen. But, if for any reason you need a full-screen editor to develop a text or source file for use in the uNETix system, you can work with the editor of your choice running under DOS and then transfer to the uNETix file system when necessary.

Programmer's Tools

The uNETix programming environment is defined by a full set of professional programming tools, including an assembler that supports both 8086 and 8087 mnemonics, a linker with options for linking from a library and generating symbol table listings, a loader that converts assembled or linked files into executable files, a librarian to maintain libraries for the linker, and an optional C compiler. The assembler accepts 135 mnemonics for the 8086 and an additional 78 for the 8087. Instructions must be in lower-case letters only. The assembler also recognizes directive commands that inform it of special conditions for initialization or of the contents of specified registers.

The linker is designed for use with library calls and links files into a single relocatable object file with resolved external references. It can receive files that have been previously output from the assembler or linker as well as output files from the librarian.

The uNETix loader program allows a full range of options for producing executable files in various formats. It has provisions for specifying the load addresses of both code and data segments. It can

produce a map listing of segment addresses and sizes either on the screen or printer and offers file formats compatible with the ICE-86 and Debug-86 on the Intel Microcomputer Development System. (ICE-86 is a program that emulates a piece of hardware to help with its development. Debug-86 is similar to DOS' DEBUG, only far more powerful.) Finally, the librarian has features for maintaining, updating, documenting, and editing a full library of assembly language routines. An evaluation of these programs is not possible here, as they were not present on the version 0.97 evaluation disk.

Once you are comfortable with the uNETix editor, starting to write shell programs is a relatively simple matter. In any case, shell programs are necessary to take advantage of certain uNETix features. The system comes configured for four windows in addition to the console. To take full advantage of the multiple screen capability, you have to add the additional windows, `w5`, `w6`, `w7`, `w8`, and possibly `w9`, to the list of devices in the `dev` file. You must also modify the `rc` shell program that opens shells in each of the windows. Although the `color` program allows you to configure the colors of the windows and borders, a simple shell program, such as my program `colorwin`, must be written if you wish to save your chosen color configuration. `colorwin` sets the window and border colors for a total of five windows, counting the console, window 0. As each window attribute blinks into color, a message is displayed: "Setting the color attributes for Window n." For those interested, the shell script for this program is given in Figure 4.

uNETix Performance

uNETix requires 512K RAM to allow its multitasking and multiple window capability to come alive. While 256K is the minimum for single tasking in one window (in addition to the 64K the program requires to load), we tried it in a 320K machine, selecting an 8K disk buffer cache. But this still allowed us to use



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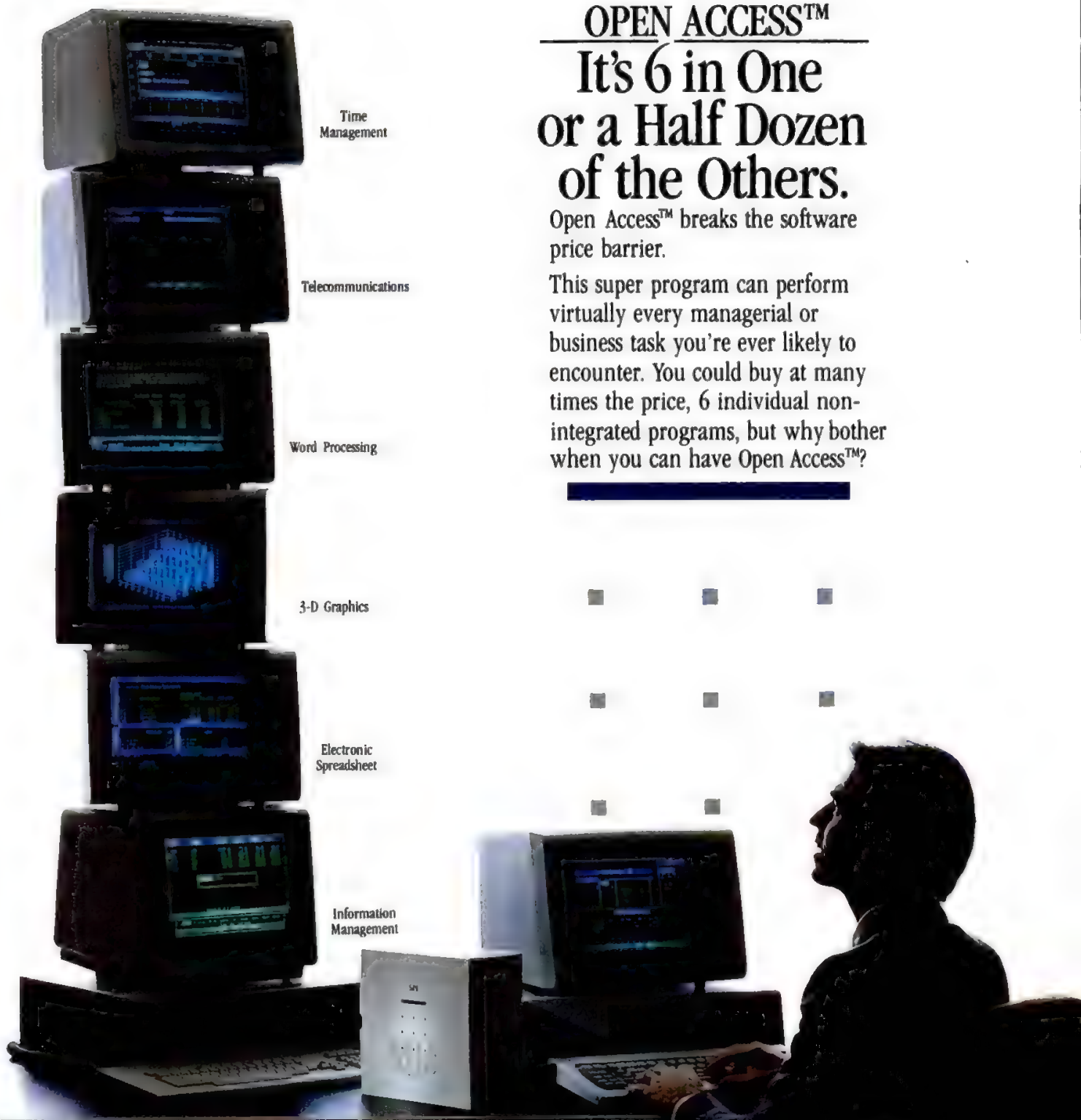
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only one task in one window.

Although uNETix is generally well behaved when you are doing things the way they are supposed to be done, if you should turn from the straight and narrow path, uNETix may crash. When you are ready to log out of uNETix, return to window 0 and enter QUIT. If for any reason you fail to do so, the file system diskette can and will become corrupt, which means it is unusable. Any files or programs on it, of course, will then be lost. Moreover, if you have failed to log off with QUIT and if your system ever crashes or locks up during a working session, you may possibly lose the contents of your file disk. The moral, of course, is that any work you don't want destroyed by some inadvertent slip-up had better be backed up right away.

For newcomers to UNIX and UNIX-like operating systems, the low price and multiple window environment make uNETix attractive. Experienced programmers with a limited budget can look forward to using the assembler, linker, loader, and librarian with the PC-DOS emulator as a multitasking development system for devising programs that can be adapted to other UNIX systems.

Since IBM's announcement of the PC/IX implementation of UNIX for the PC, shock waves have been felt throughout both the PC and the UNIX communities. Many companies are faced with the question of how this will affect them and which, if any, of the versions of UNIX for the PC they should purchase or support. Should your company buy uNETix? My answer to this question is limited, because I have seen only a pre-release version of the program and its user's guide.

In trying at least to identify the main issues, I must repeat some conventional wisdom, one of the few really solid rules of thumb in the industry: Before deciding whether or not to purchase uNETix—or any other product for that matter—you need to clearly specify what your requirements are. Whether uNETix is right for your company or organization is going to

```
echo Setting color attributes for Window 0
paint -B0 b
paint -F0 y
echo Setting color attributes for Window 1
paint -B1 c
paint -F1 m
paint -bB1 m
paint -bF1 c
echo Setting color attributes for Window 2
paint -B2 r
paint -F2 y
paint -bB2 b
paint -bF2 y
echo Setting color attributes for Window 3
paint -B3 m
paint -F3 c
paint -bB3 c
paint -bF3 m
echo Setting color attributes for Window 4
paint -B4 y
paint -F4 r
paint -bB4 r
paint -bF4 y
echo Setting color attributes for Status Line
paint -Bs m
paint -Fs w
```

Figure 4: The colorwin program.

depend on the size and nature of your workload. Two other factors are Lantech's future plans for the product and how great the outside support will be to develop utilities and applications for it.

Because of the lack of a multi-user capability and hard-disk support, uNETix is clearly not sufficient by itself to handle the needs of a large installation, even with the local area network environment that Lantech foresees. IBM's PC/IX implementation does not have multi-user capability either, however, and costs nearly three times as much as uNETix.

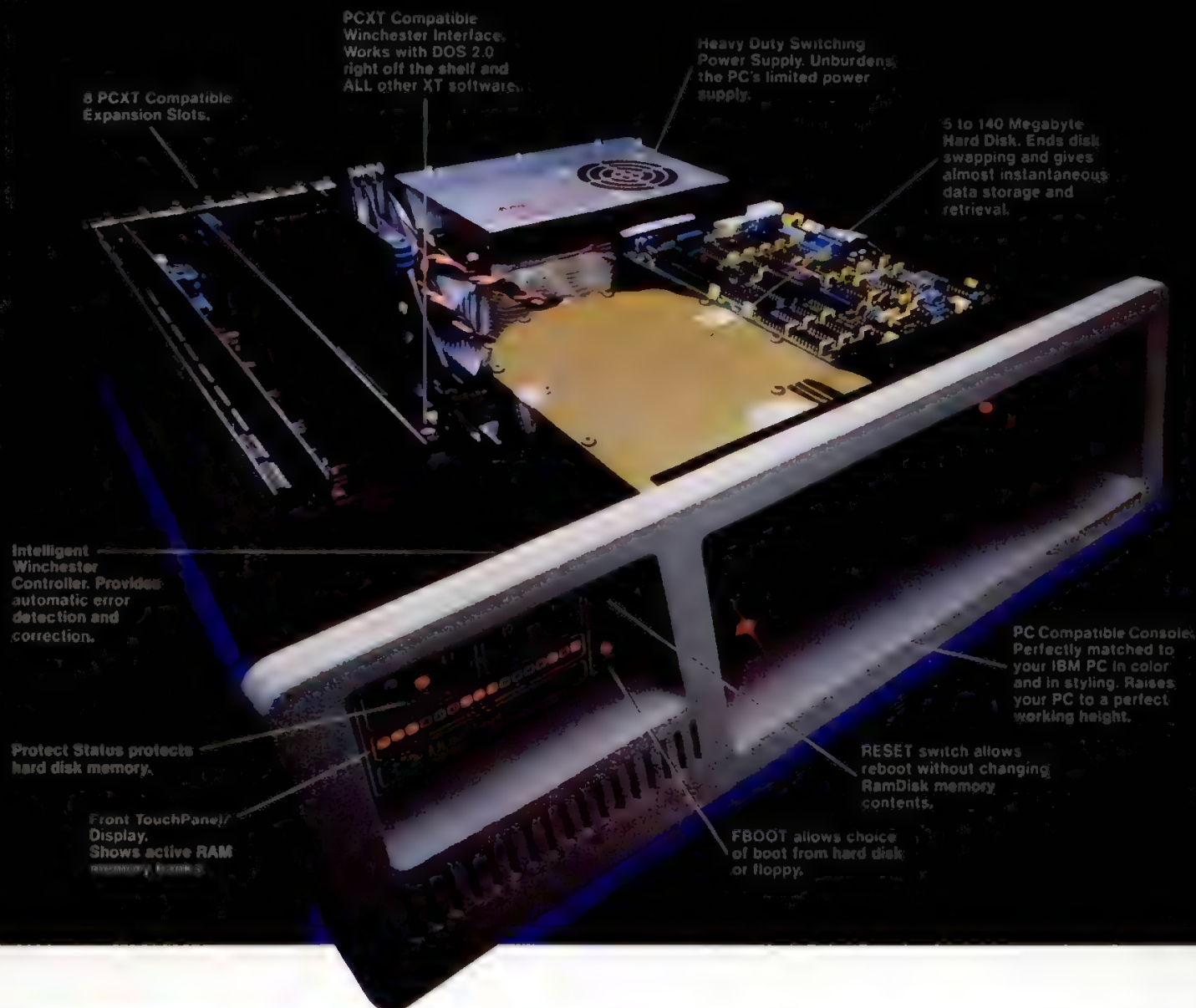
Because of its low price, uNETix may be feasible for applications that would not ordinarily be run with UNIX-type operating systems. It could also serve as an educational tool for new UNIX users. Larger companies might find it useful as a "second UNIX." Perhaps the firm that could make best use of uNETix is one with a small standalone workstation for developing programs to run on a larger UNIX Ver-

sion 7-compatible multi-user system. Here, the essential question is, what utilities will be needed for the application?

uNETix is still a young product written from scratch and without the vast arsenal of utilities often associated with UNIX. Its limitations naturally give rise to a wish list. Personally, I would like to see hard-disk support, DOS 2.0 compatibility for the emulator, faster all-around performance, and a more sophisticated scheduling algorithm for multitasking before I stand up on my chair and start cheering for uNETix. But Lantech has come a long way with this product, and these additional enhancements will possibly make it a hands-down favorite in the PC/UNIX lineup. ■

Ernie Tello is a founding partner of Integral Systems, a software development and consulting firm with extensive experience with the C language and several different implementations of UNIX.

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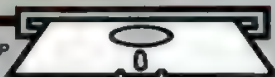
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A Venerable UNIX

VenturCom's implementation of UNIX Version 7, quietly released a year before PC/IX, is a competent and nearly complete version with good documentation.

IBM recently garnered attention when it announced its version of UNIX for the IBM PC, PC/IX. But VenturCom, Inc., of Cambridge, Massachusetts, quietly introduced an implementation of UNIX Version 7 for the PC a year ago. In fact, I saw a working version of VenturCom's VENIX/86 on a PC at COMDEX in May 1983 in Atlanta.

At the time, VENIX had a few bugs, but it was functional. VenturCom has managed to sell quite a few copies to people looking for a more professional operating system than PC-DOS. VENIX also has a major selling point that PC/IX lacks: It supports up to two additional users connected to the XT serial ports.

VENIX is based on UNIX Version 7, so it differs slightly from UNIX System III and System V, the two newer major releases by AT&T. System III comes with the Source Code Control System (SCCS), a way for programmers to keep track of different versions of a program. System V, which may become the AT&T standard, is a major upgrade with communications between simultaneous tasks and improved file locking. According to Gig Graham, vice-president of

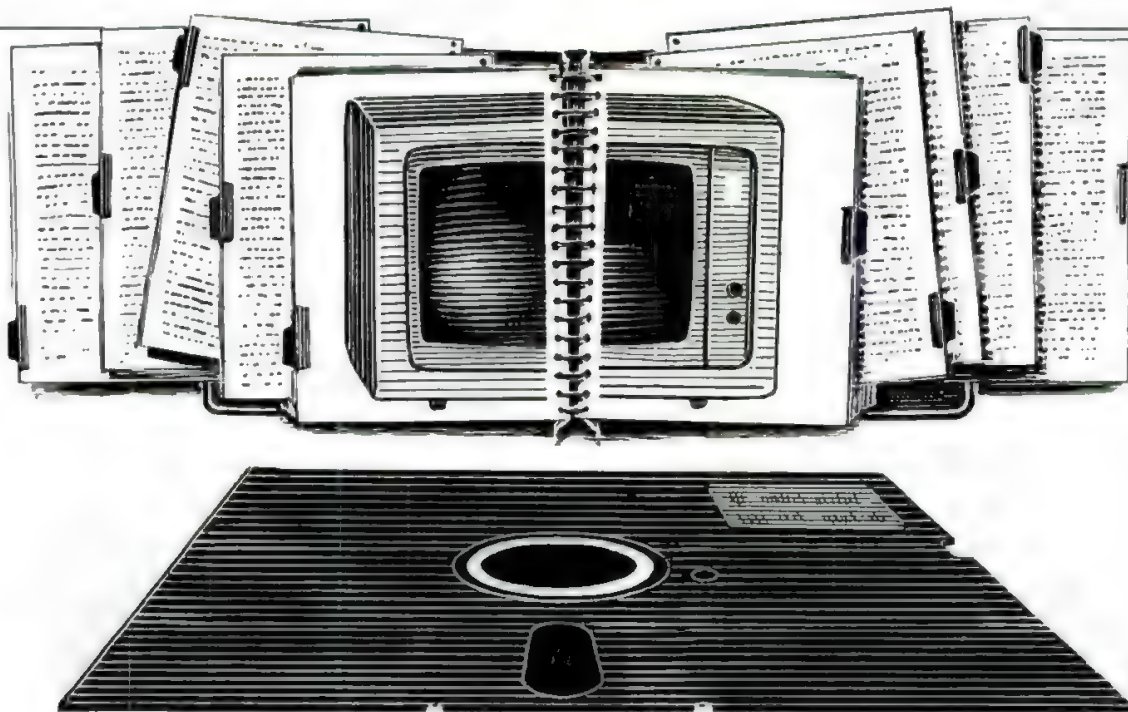
VenturCom, the company plans to support System V completely. He did not mention a release date for a new version of VENIX, however.

Philosophically, VENIX is conservatively designed. Rather than talking directly to the IBM PC, it processes all system functions through the BIOS. The advantage of such an approach is that VENIX may be easily transported to a number of XT compatibles, but the penalty you pay for portability is a slight loss in speed, particularly in the display. Disk operations, however, seem to run as fast as with PC/IX.

Hardware Requirements

VENIX/86 runs on an IBM PC-XT (or compatible) with at least 128K RAM. A minimum of 192K RAM is required for some programs, such as the C compiler. More memory gives you multitasking and multi-user options. (Multi-user capability requires a different licensing agreement and some additional files).

VENIX can support an optional 8087 chip for floating point speed. You may also use a second hard disk for additional storage. VENIX comes standard with intriguing support for the IBM color



board, which includes some graphics primitives for screen display as well as a Concurrent CP/M-like display feature that lets you redirect output to any of the four color-card pages. You can access the three additional pages by pressing Alt-2, Alt-3, and Alt-4. You can thus run a background task and have the output sent invisibly to the screen. Since VENIX has multi-user capability, the word processors available do not do "direct-to-memory" access. Instead, they work with the PC screen and with terminals.

Installing VENIX is straightforward, thanks to the excellent documentation, although a bit tedious because VENIX comes on 11 double-sided disks. The installation process took about 45 minutes, and I made one serious mistake that forced me to restart entirely. That's what you get for ignoring warning messages. An option in the installation menu lets you partition the XT's hard disk to leave one 2.5-mega-byte section free for PC-DOS or for use in case of hard-disk damage.

VENIX's Functions

Once you have installed VENIX, you'll find that it has all the major functions of UNIX Version 7, with the Berke-

ley enhancements—the C shell and the vi text editor—to boot. It also includes plenty of PC-specific functions, such as the DOS-compatible DIR, ERASE, and COPY commands for handling DOS diskettes.

The only major UNIX function that seems to be missing from VENIX is troff, the typesetting formatter. Although troff is of dubious value to most PC owners because it requires a phototypesetter, a troff driver would be useful for PC graphics printers. More unfortunate is the lack of support for device drivers. Even if your XT has a clock, you must resign yourself to setting the time manually each time you turn on your computer.

VENIX includes some quirks and some surprises. The lex utility, one of its three language preprocessors (the other two are awk and yacc) is missing one of its object libraries, so I could not create a lexical program. The lex utility does, however, produce correct C source code. VENIX's debugger, the amazingly obscure adb, worked fine—a pleasant surprise.

The graphics routines are primitive but usable. They work only in 640 X 200 two-color mode on the IBM color card. I man-

aged to get line, clear, and window to work, but others, such as fill and circle, eluded me. The problem may be incomplete documentation; more likely it's buggy software. Similarly, the graphics libraries all claim to be out of date, but you can solve this problem by re-archiving. The graphics print routines, although documented, are nonexistent.

I found VENIX's documentation both readable and remarkably complete. The only exceptions are the assembler, which is completely undocumented, and the C compiler and linker, which need better introductory material. The installation and startup instructions are clear, concise, and relatively accurate.

Tutorials and discussions cover complex programs such as vi and lex. VenturaCom seems to have taken the UNIX documentation as a base and then hired someone with good sense to rewrite parts of it. The only information left unchanged refers to the more archaic pieces of UNIX such as lex.

The documentation takes up five bulky 6-by-9-inch spiral-bound manuals. They contain numerous references to each other, so you need to have them all handy. I resent this lack of cohesion, but the man-

Standard with VENIX is the vi text editor. It beats EDLIN, but not by much. Fortunately, VENIX provides an option—The Final Word.

uals are well-organized and the references are complete. As seems to be usual in the UNIX universe, VENIX comes without on-line documentation.

Text Editing

Standard with VENIX is the vi text editor, considered by UNIX buffs to be nearly a necessity, although I think it's just barely tolerable. It beats EDLIN, the PC line editor, but not by a large margin. Cursor movement with the vi text editor is very clumsy (the PC cursor movement keys are ignored completely) and screen updating is a bit slow. Block instructions are awkward, and on-screen help consists of beeps.

Fortunately, VENIX provides an option—*The Final Word* word processing program. *The Final Word* is similar to vi in its clumsy cursor movement and block rearrangement commands, but otherwise it's a definite step up. In fact, I use *The*

Final Word for a significant number of text preparation tasks on my PC. It has a nice assortment of boilerplates for quick and easy letter and document preparation, as well as provisions for indexes, tables of contents, footnotes, and chapter and section headings.

The Final Word lets you completely redefine the keyboard if you are already used to *WordStar* or some other editor. I assume that the VENIX version, like the PC-DOS version, supports the PC's and other terminals' cursor keys, a definite advantage. *The Final Word* also supports a larger range of letter quality and dot matrix printers than any other word processing program I've seen.

Multilingual

VENIX comes with three different languages: Assembler, C, and BASIC.

The assembler (called *as*) uses some unknown syntax that is completely undoc-

umented. By taking a close look at the assembly output of the C compiler I was able to cobble together a modification that would run, but don't expect to enjoy using *as*.

The C compiler's system functions are well documented, but the instructions for invoking the compiler, linking different modules and libraries and creating unusual programs, are sketchy.

I began trying to write a C/Assembler Language driver to switch between color and monochrome monitors, but neither C nor the assembler comes with port I/O instructions. The C compiler also lacks trap interrupt routines.

In a significant departure from UNIX Version 7, the VENIX C compiler comes complete with semaphore and synchronization routines so that disparate processes can communicate, if a bit crudely. Furthermore, tasks can communicate through common blocks in memory, a most useful feature.

The BASIC interpreter is quite good. While it lacks some of the features of PC-DOS BASICA, such as graphics and full-screen editing, it has a simple interface to the vi editor for editing BASIC programs. UNIX programs may be run from within BASIC. VENIX BASIC is a nearly complete implementation with some nice UNIX touches added. Unfortunately, a few of the less common documented features are either missing or incomplete.

Last Words

I like the overall approach of VENIX/86. Some VENIX-specific features that improve task communications, such as semaphoring, have been implemented in UNIX System V, which indicates their utility.

I was a bit disappointed that a number of the less useful functions were missing or not working. I suppose that VenturCom's finite resources were applied to implementing important features and improving the documentation. What VENIX attempts, for the most part, it accomplishes. ■

The Features of VENIX

VENIX comes with the features listed here. All are standard except where noted as optional.

- Optional multi-user capability (up to two extra users).
- Optional spreadsheet and database manager.
- The Berkeley C shell.
- The *ex* and *vi* text editors (optionally, *The Final Word*.) The *nroff*, *neqn*, *ms*, and *m4* text formatters and manuscript preparation tools.
- The *diff* and *sed* text alteration tools.
- The *lex*, *awk*, and *yacc* language preprocessors.
- C, BASIC, and Assembler languages.
- The *spell* spelling checker.
- The *uucp*, *uux* library of networking/communications programs. —M.S.Z.

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A Good Buy on UNIX

The Mark Williams Company's COHERENT operating system is a rewritten version of the seventh edition of UNIX, with some extensions and enhancements. Regrettably, it has incoherencies.

The Mark Williams Company's COHERENT operating system is a state-of-the-art microcomputer implementation of AT&T's UNIX, without the state-of-the-art AT&T licensing fees. It is a completely rewritten version of the seventh edition of UNIX and includes some of its multi-user and multitasking abilities.

COHERENT first went on sale in 1980 for Digital Equipment Corporation's PDP-11 minicomputer and was then rewritten to run on computers with the most popular 16-bit chips. It currently runs on PDP-11, 8086, 8088, 68000, and Z-8000-based systems.

Although at first it sold COHERENT only through OEMs, the Mark Williams Company began selling it to IBM PC users in the spring of 1983. By July 1983, the company had released Version 2.3, which is the one reviewed here. Version 2.4 was supposed to have been available before the end of last year, but as of March 15, 1984, it was still scheduled for release sometime in the near future. Mark Williams reportedly intends to stabilize COHERENT around Version 2.5 and then build several major new features into Version 3.0.

These include networking and distributed processing options.

COHERENT runs on a PC-XT or a PC with a hard disk. You can partition your disk into two sections, one for COHERENT and one for MS-DOS. The system, which represents about 200,000 lines of source code, supports two additional computers attached through the serial ports.

What You Get

The C compiler supplied with COHERENT follows all the de facto standards embodied in Kernighan and Ritchie's classic *The C Programming Language*. It also supports the extensions mentioned in the *UNIX Programmer's Manual* such as enumerated data types, and the use of structures in assignment statements and as parameters to be passed to and returned from functions. It has many extra functions and verbose files accessed with the `include` commands. Less important features include such semantical filigree as the self-descriptive `void` data type.

This compiler only supports the small memory model, so the size of the C programs you can write is limited, but Mark



William's C compiler for MS-DOS is scheduled to support the large model within a few months. Perhaps, lurking in the wings somewhere is the corresponding COHERENT enhancement.

Another standard UNIX tool COHERENT includes is the `nroff` text-formatting program. With its extensive macro facilities, you can intersperse commands in your text that rival a programming language in their ability to manipulate and format your document. The `nroff` program is nearly as sophisticated as the more advanced word processing programs available for MS-DOS today. It easily outclasses *WordStar* and *Microsoft's Word*.

Also standard in COHERENT are `ed`, a line-editor similar to `EDLIN`, the `sed` and `diff` text editing tools, the `lex`, `awk` and `yacc` language preprocessors, an assembler, the `db` debugger, and an extremely handy `help` command.

Missing are the Berkeley enhancements such as the C user interface shell, modem communications, graphics, BASIC, Fortran, the SCCS source code control system, the `troff` typesetting program as well as several valuable text-for-

matting tools for scientific documents and many games such as *Chess* and *Hunt the Wumpus*.

Those who already have a stockpile of UNIX applications ready to compile and go are in good shape with COHERENT. However, for the rest of us, the question of how much application software is available arises. MS-DOS wasn't much to show off to the neighbors, after all, before the advent of *1-2-3* and *The Curse of Ra*. The Mark Williams people claim that within 6 months the company will have optional spreadsheet, database management, and conventional word processing packages available. And, of course, COHERENT is by definition an ideal tool for systems applications developers who are targeting their software for the burgeoning UNIX-compatible market.

The Distribution Package

COHERENT for the PC comes on seven double-sided disks. Those of you who can multiply in your heads will realize that this number represents about 2.5 megabytes of code. Actually this amount is a bit small for a UNIX system; 8 megabytes is closer to the average. Nonetheless, CO-

HERENT is about ten times the size of MS-DOS. Mark Williams saved a lot of space by omitting the on-line user manual, which is rarely even on systems with space to burn. The `man` command, which would display this manual on-screen if it were added at a later date, was not left out; this space was saved. Unfortunately, Mark Williams did omit the `spell` and `typo` dictionaries.

One of the most pleasing aspects of COHERENT is its splendid documentation: it has 1,000 letter-sized single-spaced pages suffused with intelligence and punctuated with examples helpful to both the novice and expert alike. The *Introduction to the COHERENT System* alone runs some 114 pages, and the *Administrator's Guide*, 75.

Much of this material consists of historical and literary examples and lengthy intellectual asides—good reading for a lazy Sunday afternoon.

To satisfy the purists, Mark Williams will issue the documentation for Version 2.4 in the smaller page size now standard for the PC. Unlike the gargantuan loose-leaf binders of single-sided photostats I received, all the new documentation will

be typeset, mounted in three binders, and shelved in two boxes.

Documentation of this size could not be without occasional flaws. The first two pages describing the db command, for example, were reversed in my copy. A more significant problem was that the separate yacc tutorial referred to in the command manual is nowhere to be found. The fact is that it simply will not be available until Version 2.4 is released.

Installing the System

The instructions for installing the COHERENT system are clear but incom-

Well is that an error message or isn't it? I followed the instructions, and the rest of the installation continued without a halt. The display was full of reassuring messages telling me that everything was okay, including one that read, "Your COHERENT system has been initialized". So I plodded on, hoping for the best. The next thing I did was check the file system with the command `check -s/dev/hd0`. But instead of the anticipated response, I got:

Can't find check

I restarted from scratch, got no I/O

probably all seem worth it in no time. I suggest, however, that you ignore the instructions for setting time zones, which are a real briar patch. Pretend you live in Chicago until you've mastered the rest of the system.

The instructions for authorizing new users are clear and simple. I started with two users, Dean with a password of Megalosaur, and Rusty with no password because my cat can't type anyway. I sent messages to Rusty, and then read them to him when "he" logged on.

The first thing I wanted to try, once COHERENT was up and I'd brushed the cat off the desk, was the multitasking facility. I keyed in the following commands:

```
(sleep 100;echo slept 100
secs.) &
(sleep 200;echo slept 200
secs.) &
(sleep 300;echo slept 300
secs.) &
(sleep 400;echo slept 400
secs.) &
(sleep 500;echo slept 500
secs.) &
```

What these commands do is initiate successive, unattended background processes that wait a specified number of seconds and then print a message at the terminal saying how long they've waited. Each trailing ampersand tells COHERENT to execute the parenthesized commands as a background process. I would have continued with the sequence, but COHERENT spit out the last command, saying:

Try again

Since UNIX has a reputation for being cryptic, I knew I would have to look this one up. Unfortunately, COHERENT's manual has no master index of error messages. Fortunately, I had read the installation instructions carefully and remembered seeing the message there. The cryptic note "Try again," it turned out, "indicates that the system reached its limit on

Mark Williams reportedly intends to stabilize COHERENT around Version 2.5 and then build several major new features into Version 3.0. These include networking and distributed processing options.

plete. For instance, after you have booted the first COHERENT disk, the system will prompt you to insert each of the six other floppy disks to be copied onto the hard disk. I got an I/O error message on the fourth diskette, but COHERENT continued with loading regardless and told me to mount the next volume. At that point the screen looked like this:

```
restor: mount volume 1,
type return key . . .
restor: mount volume 2,
type return key . . .
restor: mount volume 3,
type return key . . .
restor: mount volume 4,
type return key . . .
fd: error 44 20 20 27 1 8 2
(4,1): floppy error
restor: mount volume 5,
type return key . . .
```

error messages, and this time the check command responded correctly.

The manual says "If your installation of COHERENT does not succeed, either your hardware is not configured correctly or the software supplied on diskettes is unreadable or inappropriate for your system." This diagnosis is logical enough, but how do you tell for sure whether your installation succeeded if the error messages are so cryptic? Oh yes, you can issue a command called `fderror` that will translate the system's error message into semi-English, but you can only do that after you've gotten the system up and running.

Over a period of several days I reinstalled the system five times. The I/O error was not repeated, and the installations never took longer than 15 minutes. If you're willing to be nervous for a day or so when you first put up COHERENT, it'll

the number of simultaneously active processes and was therefore unable to execute the command you requested."

My machine was running COHERENT with the minimum required memory, 256K, but five still seemed a small number of tasks for the system to choke on. I remembered fondly my diligent tests on larger IBM machines in which I'd scientifically determined how many superfluous tasks had to be piled on to crash each system. Breaking COHERENT's back was disappointingly easy.

To get a picture of the status of the active processes in the system I tried the `ps` (process status) command. COHERENT replied:

Out of core

After a while the message "just slept 100 secs." appeared, followed by "just slept 200 secs.". Only then did the system respond to my `ps` command with:

UID	K
root	8K - P
Dean	34K - sh
Dean	34K - sh
Dean	9K - slept 300
Dean	34K - sh
Dean	9K - slept 400
Dean	22K - ps -flam

Each of the sleeping background processes was hogging 43K RAM, not to mention 8K for the root and 34K for the foreground shell. Just these few tasks had put me 150K in debt. For this reason I recommend that any multi-user system should have at least 512K to play with.

I had more luck with the `bc` command (a more powerful version of the UNIX `dc`), an interactive desk calculator in which you can choose the precision as you can in the Lisp language. With the COHERENT `bc`, you can finally use your computer to find out what 100 factorial comes out to. I learned that it takes COHERENT only 6 seconds to calculate the 1,000th power of 2, and 8 minutes to find the 10,000th. I forgot to write these numbers down, unfortunately.

Since I finished this article over a weekend I was not able to call the Mark Williams people for help in understanding the last error message I encountered. After rebooting, which you have to do every time you bring up COHERENT, and issuing the command `check -s/dev/hd0`, I got the response:

```
/dev/hd0:
3425 dup, class-direct,
inode=365
/dev/hd0:
```

The manual doesn't offer much help in interpreting this message, although it is evident that it is something that wants very much to become a real error message someday. The documentation suggests rebooting without issuing a `sync` command, up to three times if necessary. I rebooted five times to no avail. The manual says that this result means I might have to reinitialize my fixed disk. This prescription is not as catastrophic as it sounds, especially for a new user, since a `dos` command that copies COHERENT files to and from MS-DOS floppy disks has been thoughtfully provided. Even if a few sectors of the hard disk have become corrupt, I could probably dump the undamaged material onto a few floppies and reload it all after the reinstallation. In fact, I might even be able to do this with COHERENT-formatted disks.

Certain Incoherencies

COHERENT as it stands today retains some of the administrative annoyances that are common in larger time-sharing systems. For instance, you must always issue a `check -s/dev/hd0` command after powering-up and a `sync` command before powering-down. The documentation also says you should always remove disks before turning off the computer.

An occasional inconsistency has crept into the systems design. The `dos` command, for example, doesn't allow a minus sign to precede the options string, although this ability is a UNIX standard.

A more disturbing restriction is that you can't print a document in a background procedure unless you modify your cable to support interrupt-driven protocols rather than busy/wait logic. Somebody as hardware shy as I am is not exactly emboldened by instructions to "interchange wires ACKNLG and BUSY, which are signal pins number 10 and 11." The company blames this problem on "an IBM hardware bug," and in any case says it will be fixed in Version 2.4.

And yes, there are bugs in COHERENT. Every once in a while the system screwed up the screen attributes on my display—usually after some unusually clumsy bit of keyboard virtuosity on my part. But even so, when somebody hits the wrong key, that's no reason for the computer to play with the brightness knob.

I have also heard complaints from other users to the effect that if you have nonstandard hardware attachments on your PC, you can expect some extra heartburn when you install COHERENT. This problem may be due partially to the fact that COHERENT bypasses the ROM BIOS for the sake of speed, losing some universality in doing so. Also, COHERENT

The nroff program
is nearly as
sophisticated as
the more advanced
word processing
programs available
for MS-DOS today.

reportedly does not drive the color graphics adaptor as cleanly as it does the monochrome.

As of last November, some PC-XT owners were having trouble installing COHERENT because of what Mark Wil-

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U N I X

liams officials said were undocumented changes in some XT hard disks. However, the company permitted these users to exchange Version 2.3 for Version "2.3+", which worked. The current incarnation of Version 2.3 apparently does not have the problem.

The surprising thing is not that COHERENT has bugs, but that I could find so few of them. COHERENT is a rapidly evolving product, but it has seen none of the horrific setbacks common to less carefully nursed systems.

COHERENT of the Future

COHERENT's future appears solid, at least based on the degree of user satisfaction I found in my informal user poll taken

UNIX. It actually corrects and enhances UNIX capabilities."

Certain to appear in future releases of COHERENT are a full-screen editor named `trout` and modem communications capabilities in the form of the UNIX `uucp` command. The company is also discussing a possible version for PCs without hard disks, and a DOS emulator to let you run popular programs like *Multiplan* under COHERENT.

As for the UNIX System V standard that AT&T announced in January 1983, or its rumored "Personal UNIX", it is unlikely that the Mark Williams people will feel obliged to follow the telecommunications giant's lead. Company president Bob Schwartz is active in "/usr/group,"

COHERENT is a rapidly evolving product, but it has seen none of the horrific setbacks common to less carefully nursed systems. Its future appears solid.

on the east and west coasts. Its manufacturer appears to think so too.

One interesting development is a major contract that Mark Williams Company has signed with Commodore to supply COHERENT as the operating system for a totally new line of home computers based on the Z-800 chip that will be on sale later this year. This version will run on only two floppy drives and still have multitasking and multi-user facilities.

To make COHERENT fit such a small environment certain development tools will become "options" available to be purchased later rather than part of the standard package, although the company expects that the C compiler will be standard. The Mark Williams Company director of marketing communications read me a Commodore press release that said, "COHERENT isn't an imitation of

the nationwide association of UNIX aficionados, and is working hard with it to define a standard for UNIX apart from that of AT&T. For this reason, the company has no current plans to incorporate popular Berkeley enhancements like the "C-shell," either.

Many people who want a UNIX-like operating system are probably feeling cautious right now and waiting for the market to shake out. All I can say is that COHERENT, at \$500, is the kind of bargain that is not likely to be around forever. As planned improvements are added, this price is bound to rise commensurately. Furthermore, if you are a registered user, when new versions are released you can get a new copy with any updated documentation for only \$50, less than what Ashton-Tate charges for replacing a few bugs in *dBASE II*.

Single Dots or Double

With a soldering pencil, some wire, and a short program, you can create a switch that will turn your color monitor's double-dot characters into single-dot—and back.

If you use an RGB color monitor with your PC, you may have noticed that the characters sometimes look too fat. They look that way because IBM has selected a double-dot character font on its color/graphics card to accommodate those who use color televisions as monitors. A television accepts a narrower band of frequencies (bandwidth) than an RGB monitor, so it tends to slow a video signal's rise and fall times, thus narrowing the vertical strokes of displayed characters that have signals of short duration (see Figure 1). Despite this effect, double-dot characters are wide enough to show up well even on a poor television.

However, on good RGB monitors, or even on televisions when the particular color combination you are using results in wide strokes, the double-dot characters appear much less attractive than the narrower, more graceful single-dot charac-

ters. You might want to be able to use these slimmer characters, particularly when you have a lot of text on the screen. You might even want to switch back and forth between modes, using the double-dot mode when displaying 40 columns, and the single-dot mode when displaying 80. Unfortunately, IBM has not been of much help in making this kind of switching easy.

The Mystery

Page 2-52 of the *Technical Reference* manual for the IBM PC contains the following tantalizing statement:

"This attachment utilizes a ROM character generator. It consists of 8K bytes of storage, which cannot be read/written under software control. This is a general-purpose ROM character generator with three different character fonts. Two character fonts are used on this card (a 7×7

double-dot and 5×7 single-dot) selected by a card jumper. No jumper gives a 7×7 double dot; with a jumper a single-dot font is selected."

No further description is given. The jumper described is easily located on the color/graphics card. It's labelled P3 and is just below pins 1 and 2 of the MC6845 CRT controller. Unlike plugs P1 (light pen) and P2 (RF modulator), it doesn't have pins inserted. To permanently select the single-dot font, you could solder a wire across these two points.

The ideal solution, however, is to be able to switch between the double- and single-dot fonts whenever you choose by using software. And that's just what the project I'm about to describe will enable you to do. The procedure is possible because of the way the color/graphics card is designed. The P3 control point is connected by a 2.2K ohm resistor to +5 volts

SINGLE DOTS

of electricity; that is, it is connected to a logical value of 1, or *on*. If you install a jumper to the other P3 point, you are connecting it to 0 volts, which is logically 0, or *off*. Instead of permanently connecting it to one value or the other, you can connect it to an integrated circuit that can switch it on and off.

The best part of this modification is that it's free. The TTL integrated circuit modules used on the color/graphics card contain multiple circuits. Some have four portions, some three, and some as many as six or eight. Because of the variety of circuit types required, not all the portions are already in use. Enough spare circuit portions are available to make a "latch" circuit that will remember single- or double-dot mode. You can use another circuit to connect the reset signal to make sure that the latch always selects double-dot mode when the PC is first turned on.

What's Your Address?

Some addresses in the memory or input/output (I/O) map are needed to turn the latch off or on. Addresses 3D0 through 3DF are reserved for the color/graphics adapter. (See the *Technical Reference*, page 2-23.) If addresses within this range are selected, there will be no conflict with other conforming adapters. Addresses 3D0 and 3D1 are reserved for the MC6845 CRT controller, but since a minimum of circuitry was used, it also responds to addresses 3D2 through 3D7, and so these are unavailable for use. Address 3D8 is the Mode Control Register; 3D9 is the Color Select Register. Address 3DA contains the Light Pen Status; 3DB and 3DC are used to reset and preset the light pen trigger. This configuration means that I/O addresses 3DD, 3DE, and 3DF are unused on the color/graphics card.

In addition, a general-purpose decoder circuit module is used on the card. It decodes eight signals, in this case all addresses from 3D9 through 3DF, so the required addresses are already available. These are not memory addresses; they are

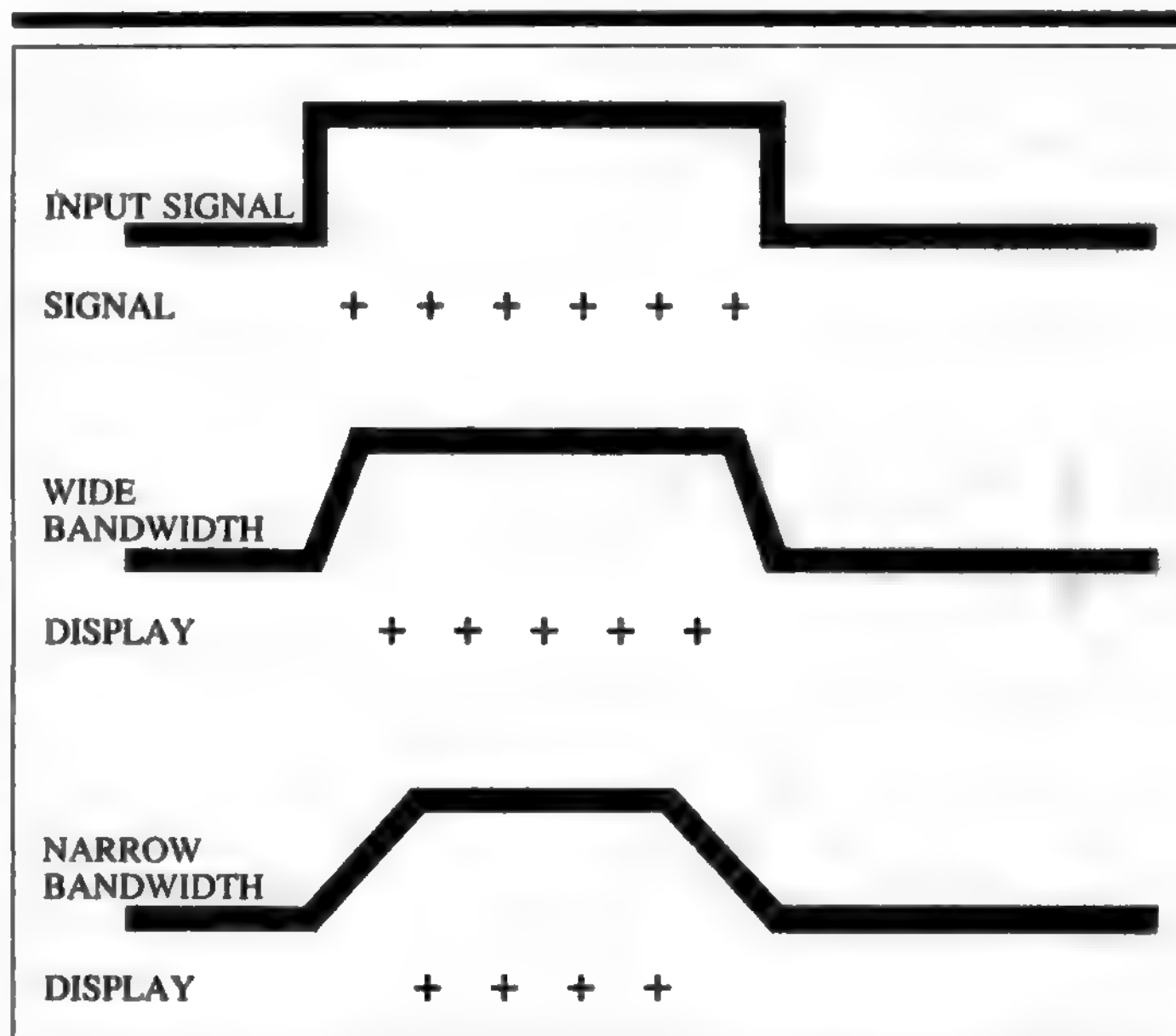


Figure 1: The effect of monitor bandwidth on width of a displayed narrow vertical stroke. The wide bandwidth unit will display a wider stroke for the same input signal.

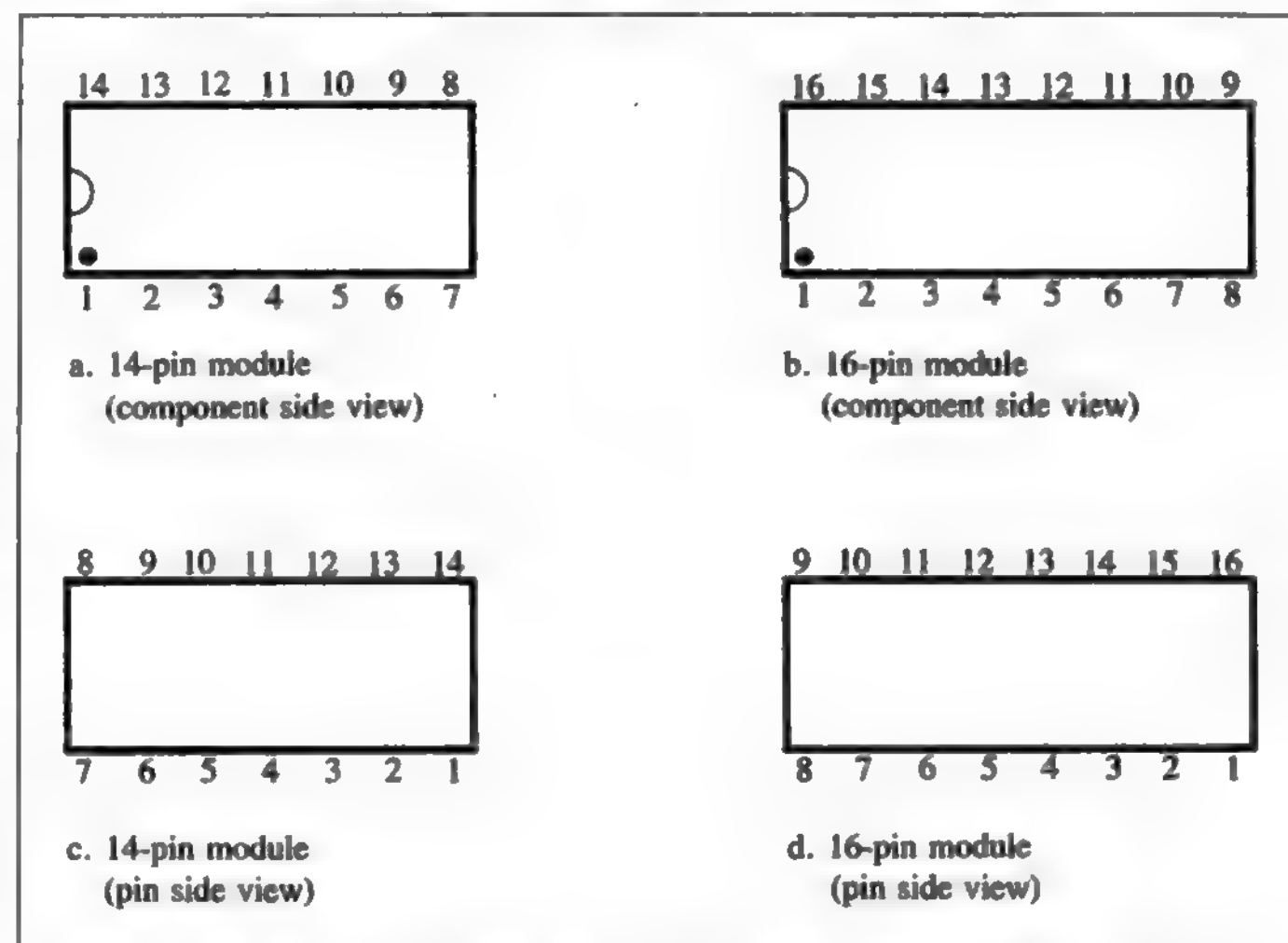


Figure 2: Identification of module pins. The round dimple above pin 1 and the oblong located centrally on the end with pin 1 are orientation markers. At least one marker will always be present.

What, No Graphics?

When in graphics mode, you have to take a different approach to obtaining single-dot characters.

The change to the color/graphics card described in the main article is effective only in the PC's text modes. It has no effect in graphics mode, since the graphics fonts for the first 128 ASCII characters is in the motherboard's ROM, not in the character generator ROM that is on the color/graphics card. The remaining 128 ASCII character shapes are not defined at all on either board. In graphics mode, a different approach to obtaining the single-dot font is needed. A complete solution might include the following steps:

- Make a mapping between the initial characters and the new ones; for example, add 128 to each character.
- Create new shapes for each character, using an algorithm to slime each one.
- Create a long (4-byte) pointer to the new shape definitions at 0:007C.
- If necessary, create an interrupt handler which intercepts all video (INT 10) interrupts, adds 128 to the characters to be displayed, and passes them on.

- Be sure to add 128 to all characters written directly to the screen.

Figure A was generated to illustrate

```

A B C
A B C

Graphics Emulation
of Single-dot mode

```

Figure A: A printout showing how a graphics mode emulation of the single-dot text mode appears.

this article. In order to print both single- and double-dot characters, it was necessary to display both fonts in graphics mode and perform a graphics dump. Figure B is the program I used to create Figure A. Dot patterns for characters A, B, and C are mapped to characters 128, 129, and 130. For the narrow font, I just copied the dot patterns listed in the *Technical Reference* manual, and manually narrowed them. —L.M.

```

1 'Program Chars-Generate Images of Single-Dot characters
2 'Copyright (C) 1984 Laurence V. Marks
3
10 SCREEN 1,0: WIDTH 40:KEY OFF:COLOR 7,0
20 CLEAR &H8000 ' save 32K bytes at end of BASIC for array data
30 DEF SEG = 0 'Set vector to high character table
40 POKE &H7C,0: POKE &H7D,&H00 ' Offset to character data =32K
50 POKE &H7E, PEEK(&H510):POKE &H7F, PEEK(&H511) ' Segment of character data,
  same as BASIC's segment
60 DEF SEG ' Set segment back to BASIC's
70 FOR I=0 TO 23:READ A$: POKE &H8000 + I, VAL("&H"+A$):NEXT I ' Read char data
80 DATA 10,28,44,44,7c,44,44,00 'Narrow A (See Technical Reference pages)
90 DATA 78,44,44,78,44,44,78,00 'Narrow B (A-75 and A-76 for examples)
100 DATA 18,24,40,40,40,24,18,00 'Narrow C
110 CLS:LOCATE 12,10
120 PRINT "A B C"
130 LOCATE 14,10
140 PRINT CHR$(128);CHR$(129);CHR$(130)
150 PRINT:PRINT
160 PRINT "FIGURE B. Graphics Emulation"
170 PRINT
180 PRINT "of Single-dot mode"
190 A$=INPUT$(1)
200 '

```

Figure B: Sample BASIC program to display single-dot characters that was used to produce the output in Figure A.

addresses in the I/O map, which are something like a second memory area in the PC that is usually used for attaching hardware devices. In BASIC, they would be accessed by an OUT or INP instruction,

Ground yourself to the PC's metal chassis before touching the color/graphics card.

rather than PEEK or POKE commands. This project will use address 3DD to set double-dot mode, and 3DE to set single-dot mode. An input instruction or an output instruction using any value will work. It might seem wasteful to use a separate address for each function instead of one address with differing data, but it's done this way to take advantage of the available spare circuit portions.

The color/graphics card should be handled with care. Ground yourself to the PC's metal chassis before touching the card. When it's out of the machine, avoid static. Place the card on foam or a soft towel to avoid bending any module pins or solder tails over. You will be connecting several pins with wire. Use solid hookup wire, not stranded. A fine-gauge wire like 28 AWG will be easier to use since most connections will be made by inserting a wire alongside an integrated circuit pin. Wire with heat-resistant insulation is best. Use a small soldering pencil (25 watts) with a well-pointed or chisel-ended tip. These precautions are necessary to avoid short-circuiting connections to adjacent circuit pins.

You will be adding all wires on the pin side, the side without the components. The module identifications are labels consisting of the letter U and a number, which are silk-screened on the component side of the card. You will need to turn the card over periodically to see these module identifications. Figure 2 shows how to identify

SINGLE DOTS

module pins. For the technically inclined, Figure 3 shows a schematic diagram of the added circuitry.

Most of the connections you make will be to integrated circuit pins. Heat the IC pin and joint and then slide the wire into the circuit board hole alongside the pin. If the wire won't enter in a few seconds, let the joint cool and try later. Don't heat the integrated circuits for more than a few seconds, and don't move the wire while it cools. If you use tinned wire, you should not need to add any solder to the joints. (Avoid solder bridges if you do.) One connection includes two wires; if they can't both be inserted alongside the module pin, connect one and then connect the other to it in a T-shaped configuration.

Here are the actual connections:

1. Connect U17 pin 9 to U25 pin 4.
2. Connect U25 pin 6 to U15 pin 4.
3. Connect U15 pin 6 to U25 pin 5. (Don't solder at U15 until the next step.)
4. Connect U15 pin 6 to point P3A. (Two wires are connected to U15 pin 6. Point P3A is the point on the P3 block farthest from the black metal card-mounting tab.)
5. Connect U13 pin 6 to U15 pin 5.
6. Connect U17 pin 10 to U13 pin 4.
7. Connect U20 pin 8 to U13 pin 5. (There may already be a yellow wire on U20 pin 8. If there is, don't remove it—just add the new wire.)

This completes the new circuit "latch." After you have used the modified adapter, and if you decide that you prefer the PC in single-dot mode when it's turned on, you can change the circuit so that it starts in single-dot mode by removing the wire added in step 4 and then connecting U25 pin 6 to point P3A. This change reverses the functions of addresses 3DD and 3DE.

How Do I Use It?

Because of the way color signals are formed, some color combinations will inevitably result in wider video signals

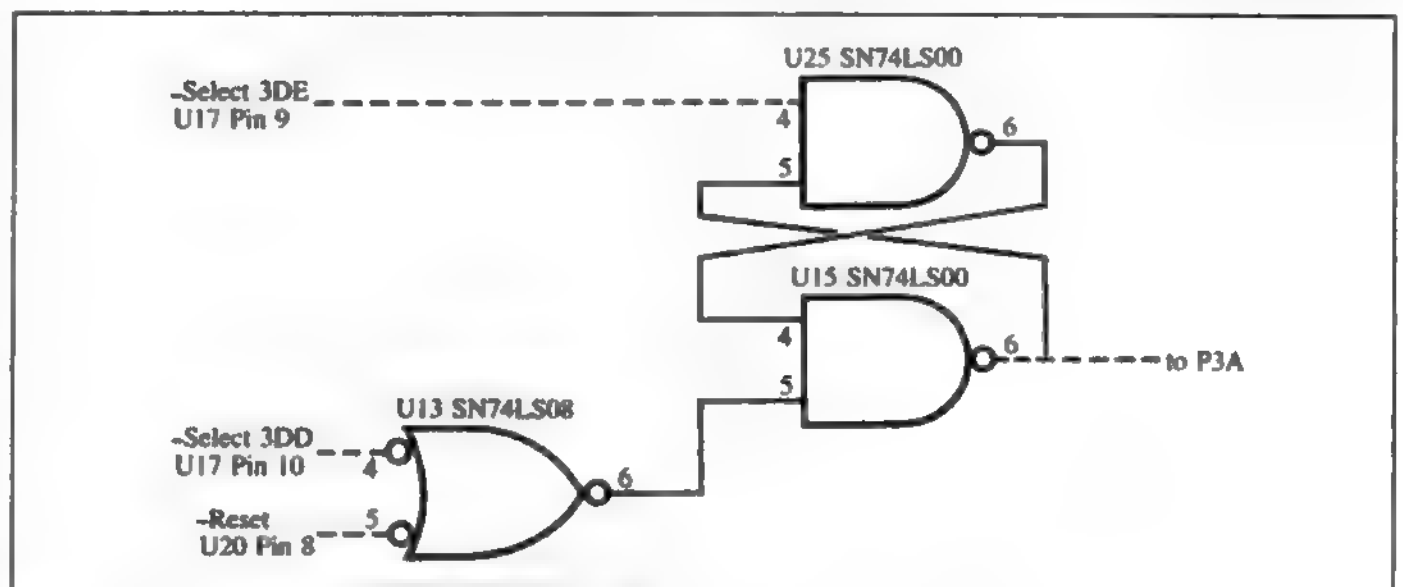


Figure 3: Schematic diagram of the added latch.

Foreground	Background	BASIC color numbers
Black	White	0,7 (Better than double-dot)
Blue	White	1,7 (Better than double-dot)
Green	White	2,7
Magenta	White	5,7
Gray	White	8,7
Brown	Black	6,0
White	Black	7,0
Yellow	Black	14,0
Brt. White	Black	15,0

Figure 4: Preferred colors in single-dot mode with a color TV and RF modulator. Parameters were WIDTH 40, SCREEN 0.1. Most foreground colors greater than 5 were adequate on a black background (color 0).

```

                                TITLE   SETSINGL
                                PAGE     255.96
;
; SETSINGL.COM To set single-dot display mode on the
;              modified Color/Graphics card
;
; Copyright (C) 1984 Laurence V. Marks
0000 ONESEG SEGMENT
                                ASSUME CS:ONESEG,DS:ONESEG,SS:ONESEG
                                ORG      100H
0100 HERE: JMP SHORT BEGIN100
0102 BEGIN100:
; ~~~~~~
; Program body
; ~~~~~~
0102 DA 03DE MOV DX,03DEH ; Address to set single-dot mode
0105 EC IN AL,DX ; I/O access to 03DEH
0106 CB ZB INT ZBH ; Return to BIOS
0108 ONESEG ENDS
;
;
```

Figure 5: Assembly listing to set single-dot mode.

```

      TITLE      SETDBL
      PAGE       255.96
; SETDBL.COM    To set double-dot display mode on the
;               modified Color/Graphics card
;
; Copyright (C) 1984 Laurence V. Marks
ONESEG          SEGMENT

```

(Figure 6 continued)

```

0100          ASSUME CS:ONESEG,DS:ONESEG,SS:ONESEG
0100          ORG 100H
0100  HERE:   JMP SHORT BEGIN100
0102  BEGIN100:
; =====
; Program body
; =====
0102  BA 03DD      MOV DX,03DDH      ; Address to set double-dot mode
0105  EC          IN AL,DX          ; I/O access to 03DDH
0106  CD 20        INT 20H          ; Return to DOS
0108  ONESEG      ENDS
;
;

```

Figure 6: Assembly listing to set double-dot mode.

```

;
; TITLE SETDOTS
; PAGE 55,96
; Copyright (C) 1984 Laurence V. Marks
ONESEG SEGMENT
ASSUME CS:ONESEG,DS:ONESEG,SS:ONESEG
0100          ORG 100H
0100  HERE:   JMP SHORT BEGIN100
; =====
; DATA AREA
; =====
0000          TAB EQU 09H
0100          LF EQU 0AH
0100          CR EQU 0DH
0102  DB CR,LF,'Enter...'.LF,'1 for Single Dot Mode'
;
; DB CR,LF,TAB,'2 for Double Dot Mode'.CR,LF,'0'
;
013D  BEGIN100:
; =====
; Write the Message
; =====
013D  BA 0102 R    MOV DX,OFFSET MSG      ; DS already points to ONESEG
0140  BA 09        MOV AH,09H           ; DOS function to print string
0142  CD 21        INT 21H              ; DOS function call
; =====
; Prepare to do the OUT to the Color/Graphics Card
; =====
0144  BA 03DD      MOV DX,03DDH         ; Address for double dots
; Address for single dots is
; one greater
; =====
; Get the Keystroke from DOS
; =====
0147  BA 01        MOV AH,01H           ; DOS function to get a key
0149  CD 21        INT 21H              ; DOS function call
; =====
; Test for '1' or '2'
; =====
014B  3C 31        CMP AL,31H           ; Keystroke = '1'?
014D  74 06        JZ INCREMENT         ; If 1, output to 03DE
014F  3C 32        CMP AL,32H           ; Keystroke = '2'?
0151  74 03        JZ OUTPUT            ; If 2, output to 03DD
0153  EB E8        JMP SHORT BEGIN100  ; If neither, start over
; =====
; Do the output
; =====
0155          INCREMENT:
0155  42          INC DX                ; Add one to DX
0156          OUTPUT:
0156  EE          OUT DX,AL             ; 03DD or 03DE
; =====
; Return to DOS
; =====
0157  CD 20        INT 20H              ; Return to DOS
0159  ONESEG      ENDS
;
;

```

Figure 7: Assembly listing to set either dot mode.

than others. These combinations are the ones that look best in single-dot mode. Using a color television and an RF modulator, I discovered that the combinations listed in Figure 4 looked best. On an RGB monitor, I found that the single-dot format looked better with every color combination.

Now that the latch is in place, to select single-dot mode from BASIC, you simply

Because of the way color signals are formed, some color combinations will result in wider video signals than others.

issue the command OUT &H3DE, 0 from direct mode. To return to double-dot mode, issue the command OUT &H3DD, 0. Of course, you can program two function keys to do the switching by typing:

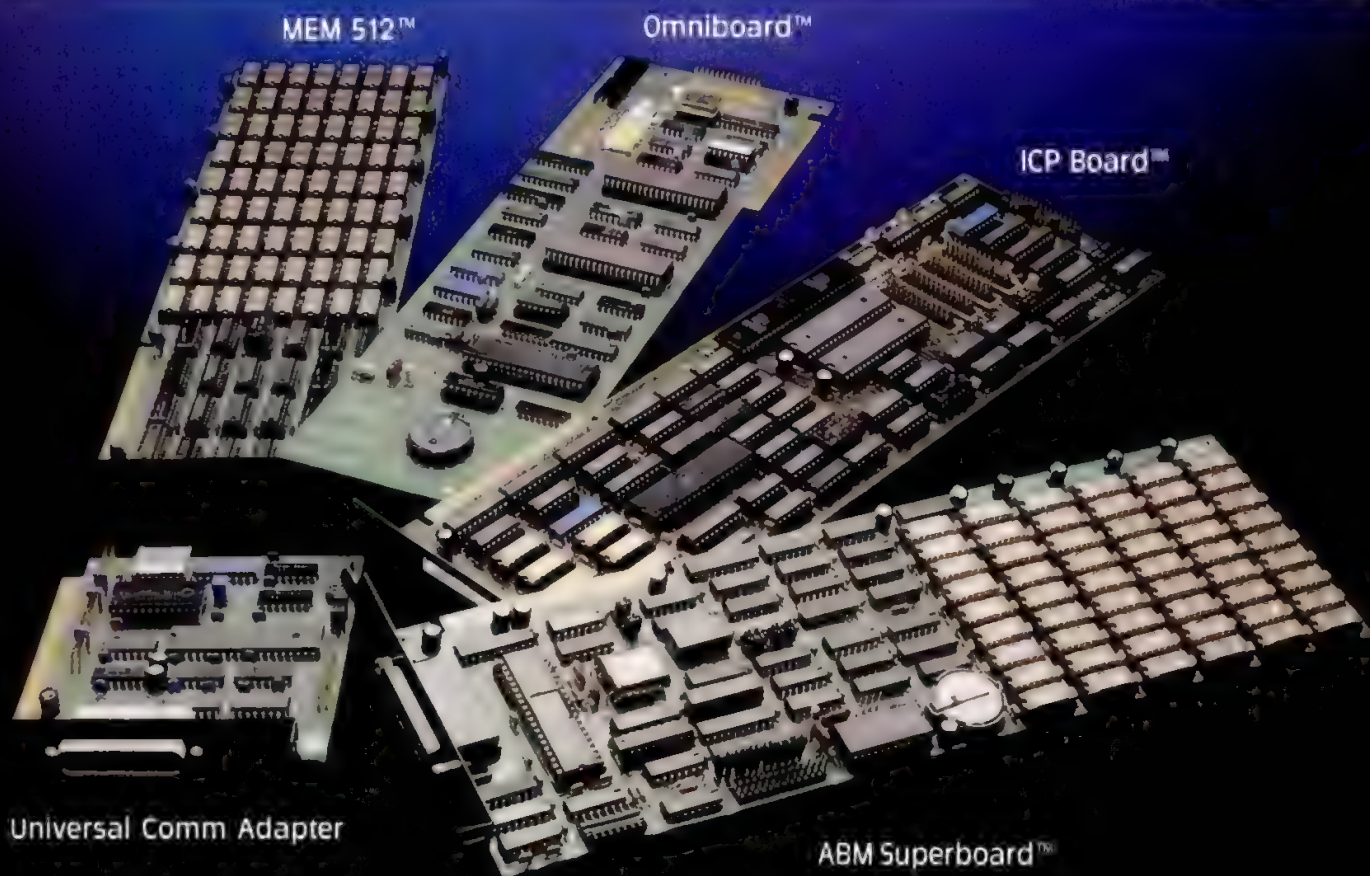
KEY 9, "OUT &H3DD,
0"+CHR\$(13)

and

KEY 10, "OUT &H3DE,
0"+CHR\$(13)

or program two keys to go to subroutines that output to these addresses. Figures 5, 6, and 7 are assembly language listings that can be used if you wish to alter the dot mode without entering BASIC. You might wish to name such a file in an AUTOEXEC.BAT file that leads into a spreadsheet or word processor on the color monitor. Figure 5 is a program that switches the monitor to single-dot mode; the listing in Figure 6 switches it to double-dot mode, and the listing in Figure 7 asks you what mode you want to use. If you don't have the necessary assembler, you can enter the bytes EB 00 BA DE 03 EC CD 20 in hexadecimal code directly into a file.

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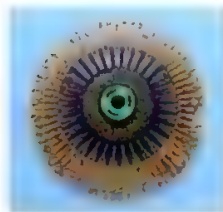
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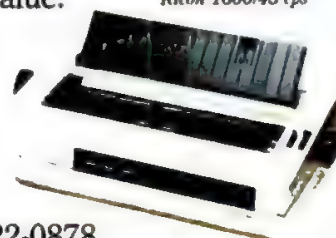
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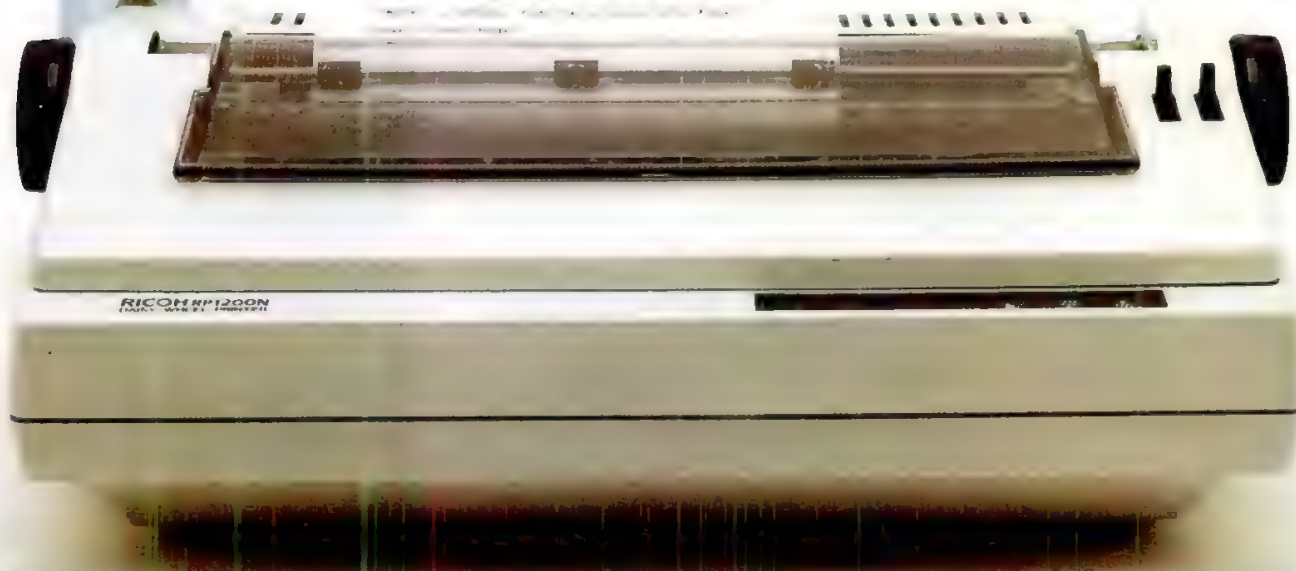
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CIRCLE 355 ON READER SERVICE CARD

Opening Windows

Microsoft's prototype windowing "shell" for DOS, MS-Windows, has some similarities to the Macintosh and Visi On systems, but also makes some significant departures.

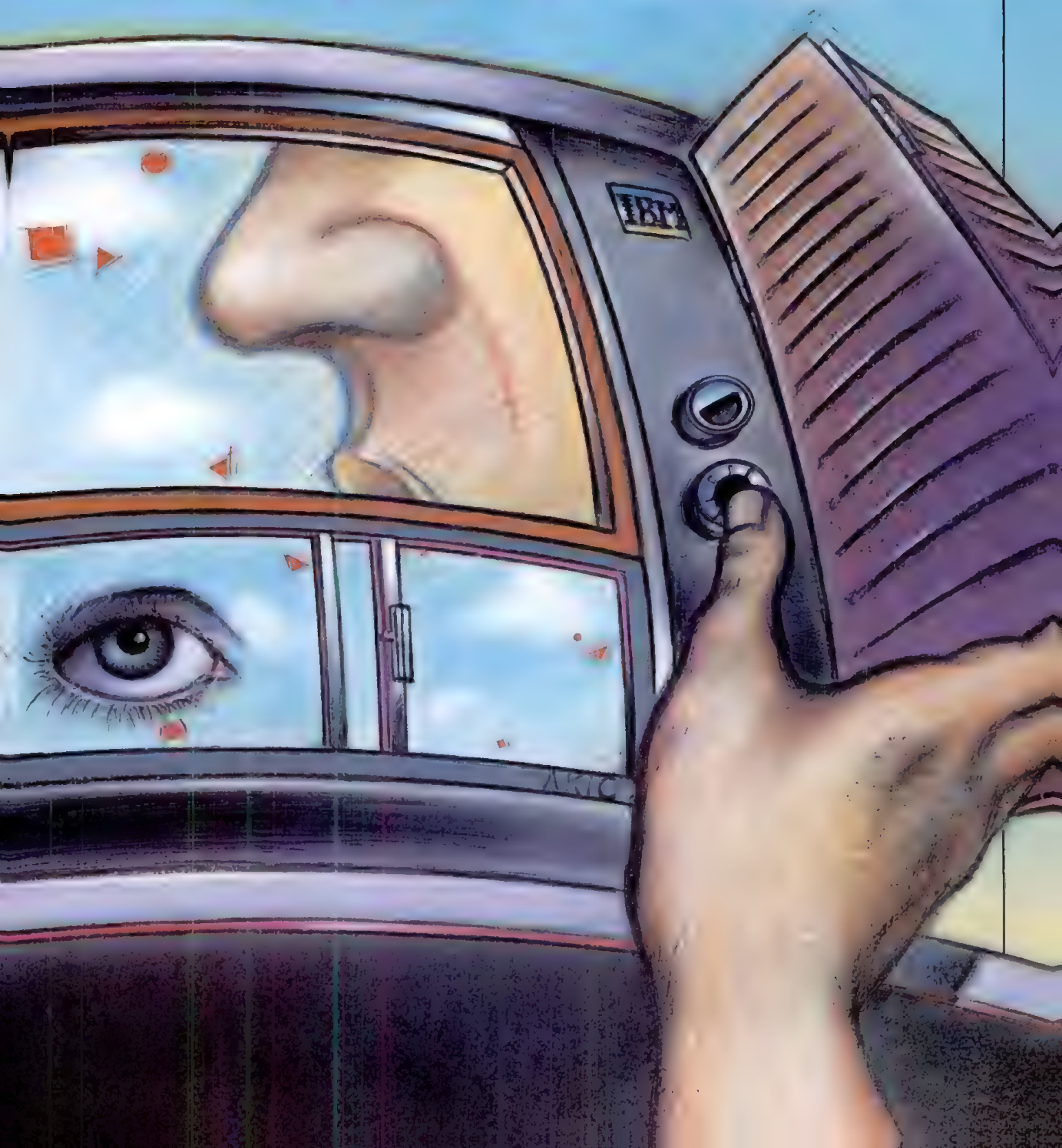
About 18 months ago industry watchers concluded that Microsoft was intending to develop some kind of "visual front-end" or user-friendly "visual shell" for its MS-DOS operating system. Most weren't certain precisely what this user interface "shell" would entail, but everybody hoped for the best.

At the least, observers were sure it would be some kind of menu-driven system; at the most it would offer some as-yet-unspecified graphics capabilities.

That mysterious "visual shell" has now been dubbed MS-Windows. Microsoft has not only made a substantial departure from its traditional MS-DOS operating system design but has essentially started from scratch and developed a new operating system product for IBM and other MS-DOS-based



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MonoGraphPlus Graphics Card

CIRCLE 103 ON READER SERVICE CARD

MS-WINDOWS

machines.

At a recent 2-day MS-Windows technical seminar, which was attended by over 300 software developers, the product was more formally described by a company spokesman as "not an application or a user shell, but an extension to the MS-DOS operating system." Microsoft, he said, "intends to market MS-Windows as if it were an operating system, to sell it the way we sell DOS."

The notion behind MS-Windows (and behind almost every other windowing system) is that the computer user can simultaneously display and manipulate the contents of several documents or programs.

They all use windows—designated areas on a computer screen that typically, but not necessarily, take up less than the total screen area and that can be made larger or smaller to show more or less of their contents. Previous windowing systems developed by Xerox (the 8010) and more recently by Apple Computer (Lisa and Macintosh) and Visicorp (Visi On) all employ windows that may be overlapped as if they were sheets of paper on a desktop. Selecting any single window with the mouse makes it the "active" window.

Tiled Windows

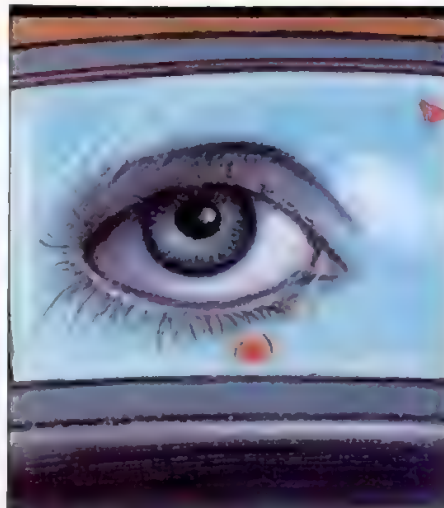
For MS-Windows, Microsoft has departed from these precedents by creating "tiled" instead of overlapped windows. Tiled windows give the illusion that they are all active simultaneously because they can all be seen at once. But, in fact, they are not all active because MS-Windows is not multitasking. In overlapping window systems, many (perhaps as many as 20) windows can be open on the metaphorical desktop.

In a tiling system, windows "meet" at their edges much like the tiles on a floor or on a wall do. Since each window fights for space with other windows, there is a practical limit to the number that can be simultaneously open. If two windows are open, they will each take up half the screen, either vertically or horizontally. If a third window is opened, the two original win-

dows will shrink to give the new window some screen space on which to display its contents.

To open a window in the MS-Windows systems, you move the mouse-controlled pointer into a special "parking space" at the bottom of the screen reserved for icons representing applications or utility programs. Various types of icons will appear there, depending on the range of applications that are available.

During the MS-Windows seminar the most often displayed types were the floppy disk icon, which indicates which disks are loaded; the clock icon, which can be used for file time stamping; the paint icon (a



paintbrush), which accesses a graphics application; the document icon, which accesses a text file; and the litter icon, which is used to discard or delete data (equivalent to the trash icon on the Lisa and Macintosh). Once you have located the particular application or document that you wish to use, you "pick up" the icon with the mouse pointer and transport it into the main screen area above the other icons. Letting go of the icon, by releasing the mouse button, causes that file to open up and display its contents. The former location of the icon is indicated by a cross-hatched area.

At the top left corner of the now-open window is a small rectangular box that, when selected by the mouse pointer, ends

the application program session. At the top right corner is a question mark that is used to summon help from the MS-Windows system if you aren't sure how to proceed with some task. Across the top of the window appears your name for it, or a default name if you haven't yet thought of your own.

Although Microsoft seemed reluctant to compare MS-Windows with Apple's Lisa and Macintosh, the version of the system demonstrated during the technical seminar featured Apple-like scroll arrows and scroll "elevators" that can be used for making large jumps vertically or horizontally within a window. Such similarities

Microsoft has not only made a substantial departure from its traditional MS-DOS design but has essentially developed a new operating system.

are not surprising since Microsoft is plowing considerable resources into developing (or maybe I should say redeveloping) products for the Apple Macintosh.

Requirements

Microsoft intends to officially release MS-Windows as a run-time system in August or September of this year (software developers will receive their developer tool kits plus MS-Windows in May). The system should be quite inexpensive or even free, since some original equipment manufacturers (OEMs) will bundle the product in with their systems.

Right now it looks as if the system will work on a PC or similar 8088/8086-based computer equipped with 92K RAM, a bit-

mapped screen, a mouse, and two floppy disk drives, although Microsoft officials said 512K of main memory might be much better. While one Microsoft spokesman said that it may be possible to run MS-Windows on a 128K machine, its performance with that configuration would be nothing to brag about.

It is probable that even with 192K RAM, the operating system would still need to send a fair amount of data traffic between main memory and the two floppy disk drives.

Interestingly, Microsoft says that a hard disk is optional for MS-Windows and would, in fact, not greatly increase the system's performance. Originally, Visi-Corp had hoped that it, too, would be able to offer its Visi On windowing system on a 128K personal computer with twin floppies—this product now requires a minimum of 512K RAM and a 5-megabyte hard disk.

The minimum size bit-mapped display MS-Windows requires is 400×200 pixels although it can support much larger sizes (up to 1000×1000). Since the actual shape of characters on a 400×200 screen will differ from those on, say, a 600×400 screen, Microsoft has made sure that you can adjust the aspect ratio or visual appearance of images depending on the type of hardware you are using.

Here are a few important points about MS-Windows that were described at the seminar: The system will not be a multi-tasking one, but it will attempt to appear that way. It will work with most current MS-DOS software, but not all by any means and it will require independent software vendors to be careful when they write code since MS-Windows needs the presence of certain elements before it works efficiently.

Pseudo-Multitasking

First let's look at the way in which Microsoft has enabled MS-Windows, which is a single-tasking operating system, to handle display for and work with more than one application.

Graphics Device Interface

GDI frees the software developer from concerning himself with the type of devices and device drivers installed on an MS-Windows system.

Microsoft's Graphics Device Interface (GDI) is essentially a graphics language and interface standard that frees the software developer from concerning himself with the type of devices and device drivers that are installed on an MS-Windows system. On the other hand, the GDI does allow applications to query devices as to their characteristics, including whether or not they use raster or vector display technology, how large they are, and the maximum resolution possible.

While Microsoft developed the GDI specifications it will not be developing the many device drivers that will be needed. Instead, a company called Graphic Communications, Inc. (GCI) is currently developing a set of ten device drivers, featuring a mixture of printers and plotters, that will be included in the MS-Windows software developers toolkit now being assembled.

Beyond software developers, GCI intends to market various device drivers directly to OEMs and end users, too.

GDI functions are described by Microsoft as Context, Control, Output, Text, Bundled Attributes, Transformations, and Clipping. Limited examples of each function are given below.

The Context function deals with acquiring, saving, and releasing "device contexts":

```
hDC = CreateDC
      ("<logical>", "<physical>")
      DestroyDC (hDC)

level = SaveDC (hDC)
        RestoreDC (hDC, level)
```

The Control function deals with such jobs as device initialization and the pass-

ing of information about installed devices:

```
StartPicture (hDC)
EndPicture (hDC)
NewFrame (hDC)
    * used to advance to "new page"
Clear (hDC)
```

* used to refresh display medium
The Output function handles the physical creation of bits on the screen:

```
Move (hDC, x, y)
Line (hDC, x, y)
PolyLine (hDC, pPoints, count)
Rectangle (hDC, x1, y1, x2, y2)
Ellipse (hDC, Cx, Cy, Dx, Dy)
```

The Text function is pretty self-explanatory and is presented as below:

```
Text (hDC, Chars, count)
long = InquireTextExtent
      (hDC, pChars, count)
```

Among the Bundled Attributes we find five types:

```
Creation by Index: 1
hObj = GetPen(index)
    * used for line drawing
hObj = GetBrush(index)
    * black/white/striped
Creation from Parameter block: 2
hObj = CreatePenIndirect
      (pObj)
hObj = CreateBrushIndirect
      (pObj)
Creation from parameters: 3
hObj = CreatePen
      (style, x, y, color)
hObj = CreatePatternBrush
      (hBitmap)
hObj = CreateFont
      (face, xsize, ysize, xmove,
       ymove, xup, yup, color,
```

(continued)

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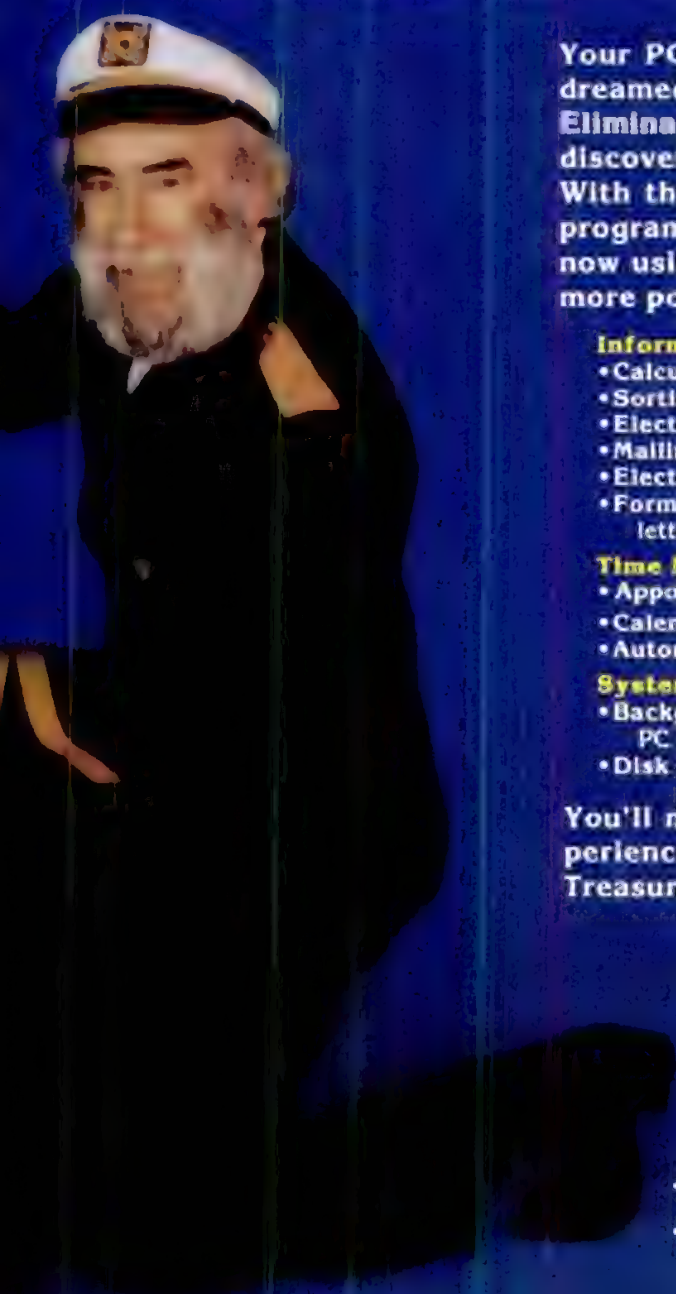
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(Graphics Device Interface continued)

weight, italic, underscore,
strikethru, outline)

Attributes: 4

SelectPen (hDC, hObj)

SelectBrush (hDC, hObj)

SelectFont (hDC, hObj)

Attributes: 5

InquirePen (hDC, pObj)

InquireBrush (hDC, pObj)

InquireFont (hDC, pObj)

There are three GDI Transformation types:

Transformations: 1

short = InquireDrawingMode
(hDC) Set Drawing Mode
(hDC, value)

Transformations: 2

long = InquireViewportOrigin
SetViewportOrigin
(hDC, x, y)

Transformations: 3

long = LogCtoDevC
(hDC, x, y)
long = DevCtoLogC
(hDC, x, y)

Finally, there is the Clipping function used to maintain the correct window images:

Clipping:

cflag = Intersect Rect
(hDC, pRect)

cflag = Exclude Rect
(hDC, pRect)

cflag = Inquire Clip B Box
(hDC, pRect)

Here is a fairly simple program provided by Microsoft that uses some of the facilities listed above:

hpen1 = GetPen
(PENINDEXBLACK);

hpen2 = CreatePen
(DASHED, 0, BLACK)

hbrush = CreateSolidBrush
(WHITE);

SetWindowExtent
(hDC, 1000, 1000);

MoveTo
(hDC, 200, 800);

Text
(hDC, CLPSTR) Text, 4);

MoveTo
(hDC, 100, 200);

SelectPen
(hDC, hpen1);

LineTo
(hDC, 600, 700);

SelectPen
(hDC, hpen2);

SelectBrush
(hDC, hbrush);

Rectangle
(hDC, 200, 400, 500, 600);

The MS-Windows development team originally wanted to make the system truly multitasking, but the demands of the marketplace did not allow enough time to do so. Instead, Microsoft settled for giving MS-Windows the appearance of multitasking. Multitasking systems continually share central processor resources among various programs, but MS-Windows never takes control away from an application that is running. Although it will keep several applications on the screen and transfer control and information smoothly among them, MS-Windows is unlikely to be as fast as a true multitasking system.

Since Microsoft has decided to give the impression that all the windows are active at once (although the system has to con-

stantly note which window is currently in use so that keyboard or mouse input can be directed to the right location), it will be important to minimize delays when the user switches from application to application. Programming for a pseudo-multitasking operating system has many implications, and it remains to be seen how independent software developers will cope.

What Will Run?

Whether or not a particular piece of MS-DOS software will run under MS-Windows depends on a number of factors. If the software has been designed specifically to work with MS-Windows, then it will work not only on the machine it is

written for, but on any machine that supports the standard MS-Windows environment.

Software written under MS-DOS will work as tasks under MS-Windows with minimal or no modifications if, and only if, it makes no assumptions about the hardware it is running on. MS-DOS "based" products, those that use the operating system to some degree, but also assume the presence of color facilities or certain kinds of devices, and especially those that write directly into video memory without regard for other functions, will not work well, or in some cases, at all.

On the other hand, MS-DOS "compatible" software products that have no particular hardware dependencies should operate without modification, according to Microsoft officials. Whether these products will be able to access all MS-Windows functions is not yet clear.

The software developers at the seminar were interested in whether or not MS-Windows will be able to support color. The answer is no and yes. Microsoft will not provide internal support for color in the first release of the operating system. However, in the interface specifications given to OEMs, the company has made it abundantly clear to those that wish to write the necessary code extensions how to include color facilities. (Many OEMs at the seminar were displaying color versions of MS-Windows on their machines.)

Code Development Standards

Assuming that all software developers will follow a set of code development standards is like assuming that everybody pays his taxes. Some people will always use the easiest way to put something on the screen. It is after all much simpler to write a piece of cuckoo-like code that takes over the nest instead of sharing it, preventing additional applications from occupying any part of the screen or memory while it is running.

To create an MS-Windows application, independent software vendors will have to learn about designing icons and handling

multiple text fonts, including such things as the best aspect ratios and the best way to transform plain text into an italic or a bold-face. They will also have to contend with some more nitty-gritty problems such as the type of windows to use and how to overcome bad habits they picked up while developing one-track programs.

Although I said earlier that Microsoft has used window tiling to display multiple sources of information simultaneously, the truth is that tiling is only the preferred technique. If software developers wish to employ windows that overlap, then they may do so. If developers wish to employ Macintosh-style windows (but not icons), they may also do so. However, Microsoft has included all the necessary code to draw standard Microsoft windows if developers include the right calls in their applications.

This code saves developers from having to recreate it every time it is needed, but the system is designed so that it is also easy to avoid the Microsoft code and go off on a unique window design path. Apple and VisiCorp have developed what they believe are viable user interface designs within a tightly controlled operating environment. It is unlikely that all developers will implement the same sorts of interfaces under such a loosely controlled system as MS-Windows.

As loosely controlled as the system may be, developers will have to adhere to some standards. During the seminar, Microsoft staff members continually emphasized the dangers of employing certain code development techniques or of not employing others. Developers should, for example, refrain from hard-coding disk drive identifiers (such as A: or B:) and file names within applications. Also, they should use the hierarchical file structure—first introduced with MS-DOS version 2.0—since it will bring benefits such as greater portability between machines like the PCjr and the PC.

Microsoft particularly frowns upon those applications that don't always close files, and especially File Control Blocks,

after they have opened the files.

The importance of all these do's and don'ts is clear when you consider that the first version of MS-Windows will eventually be replaced by a true multitasking version and a multi-user version for networks running under Microsoft's XENIX operating system. Upward migration of applications to these environments will be hindered if developers do not take great care in coding them.

In these situations, programs that have the short-sighted objective of grabbing any system resources they find will not work

Assuming that all software developers will follow a set of code development standards is like assuming that everybody pays his taxes.

well under MS-Windows. A multitasking system, by its very nature, assumes that hardware and software components are cooperating to permit the user to do as much as possible. Similarly, a multi-user system assumes that files and records can be locked off from additional users and that when a program has finished using a system resource it releases that resource in an orderly manner for use by other people's applications.

Data Formats

To cope with the multitude of data formats currently used in MS-DOS applications, Microsoft has made MS-Windows able to recognize the binary, DIF (developed by VisiCalc inventors Software Arts), SYLK (by Microsoft), and ASCII formats. This ability simplifies the task of data interchange between programs that until now have been total strangers.

At the seminar, Microsoft officials explained that MS-Windows can match up compatible formats among applications. For example, two applications might be able to accept the following data formats:

Application 1
Private Binary X
Private Binary Y
SYLK
Text
Application 2
Private Binary Z
SYLK
Text

In this case data transfer can only take place using the SYLK and Text data formats. To match the formats, a large amount of back and forth checking between applications has to occur.

In addition to using data formats explicitly supported by MS-Windows, software developers will be able to build their own special (that is unique) data transfer protocols.

Permitting developers this latitude with protocols might run the risk of making the system too malleable. You shouldn't be too surprised if, along with the good stuff, new MS-Windows applications bring diversity and many disasters.

Development Environment

Some developers expressed concern that Microsoft was limiting them to developing applications for MS-Windows on an IBM PC. They said they were already using a DEC VAX or some other similar machine and hoped that MS-Windows compilers would be made available for these machines as well.

Microsoft says it has been developing the system using 15 IBM PCs, each with 512K memory and a network interface card. They link into a sixteenth IBM PC that acts as a network file server.

Each of the 15 also has one floppy disk drive, a mouse, a color graphics board, a serial port with external console, and a network card. The file server PC has 640K memory, two 64-megabyte hard disks,

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MS-WINDOWS

two printers, a network card, and a floppy disk drive. Microsoft is using Microsoft C (the Lattice C compiler) and the Microsoft Macro Assembler as its development languages.

Naturally, a single IBM PC or XT with 512K of main memory and all the other paraphernalia will do as an applications development machine for smaller organizations.

Will It Succeed?

To be a success, MS-Windows must gain support from independent software developers. Many such developers attended the technical seminar and will be receiving their toolkits, but it is by no means certain that they are all capable of developing software to run under MS-Windows. Companies like Software Publishing Corporation, Software Arts, and Lotus Development Corporation will probably take the lead in developing applications, since they are all familiar with the MS-DOS environment and are highly unlikely to give up this advantage and adopt a competitive product such as VisiCorp's Visi On.

MS-Windows must also earn the support of OEMs who will bundle the product in with their systems. Although IBM was notably absent from the lineup of companies that were demonstrating MS-Windows on their machines at the technical seminar, this list is still a good one. It includes: Altos, Bytec-Comterm, Columbia Data Products, Compaq, Digital Equipment, Hewlett-Packard, Honeywell, ITT Qume, Mindset, Polo, Rana Systems, Tandy, Televideo, Texas Instruments, and Zenith Data Systems.

These points may seem obvious, but gaining this support is not a trivial matter for Microsoft. It will have to do a lot of coaxing and coaching of allies before MS-Windows will be accepted as a serious and complete product by the end-user.

Finally, Microsoft must launch MS-Windows in the August/September period, as it as promised, without delay or major omissions.

Climbing Around in The DOS Directory Tree

Learning to manipulate DOS 2.0's many-layered subdirectory system can be valuable for both fixed disk owners and those who keep lots of files on their floppies.

The following material is excerpted from Chapter 6 of the forthcoming book, *DOS Primer for the IBM PC and XT* by Mitchell Waite, John Angermeyer, and Mark Noble. It explains how to use the DOS 2.0 system for creating directories and subdirectories and moving among them. Copyright 1984. Reprinted by permission of New American Library.

The DOS directory command, DIR, is the magic word that lets the genie out of the bottle. It reveals several important details

DOS Primer for the IBM PC and XT
Mitchell Waite, John Angermeyer, and Mark Noble

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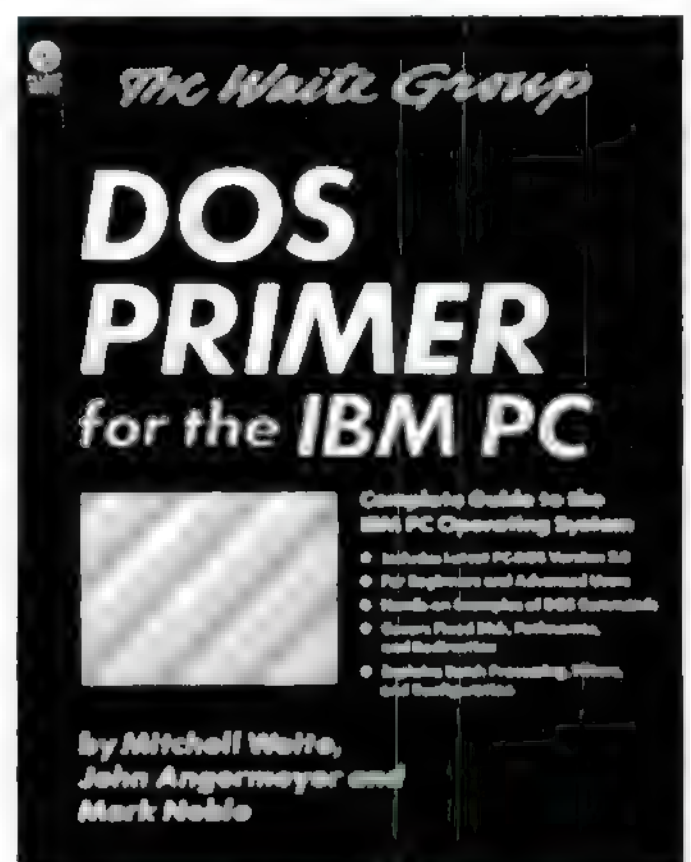
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about the contents on a disk: the name of the files on the disk, each file's moment of creation or last modification, and its size in bytes. Using the DIR command is like flipping through the table of contents of a book.

But what happens when you have a great number of files on your diskette? The answer is similar to what happens when there are too many chapters in a book: the table of contents for the book grows longer and longer and becomes



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more difficult to use. This problem, of too many files and the complexity of the "table of contents" is exactly what PC-DOS 2.0 solves and what this chapter is about.

Too Many Files

An IBM PC double-density, double-sided disk can hold up to 112 files and a single-density disk up to 64 files. One hundred and twelve is a lot of files for a diskette. A directory of a disk containing the full 112 files would fill four screens and take approximately 15 seconds to display.

Yet even with this limitation, all was peaceful across the land. People simply dedicated a diskette to a specific function. However, in early 1983 IBM announced its fixed disk for the PC, a storage device capable of much higher capacity than a floppy diskette. At that crucial point, everyone realized the same thing: a fixed disk could store up to 10 million characters worth of information. This character count translates to literally thousands of files. People would need a way to keep track of these files that was simple to understand and physically easy to operate. Our book analogy fits: Since the fixed disk can contain thousands of "chapters," you need a table of contents for the main table of contents! Further, you can't make people wait for thousands of files to scroll by, and you can't ask DOS to keep thousands of files in a single directory.

The solution? IBM simply turned to techniques developed for "high performance" operating systems, the kinds used on mainframes and minicomputers. It adopted a strategy called the "tree-structured directory," also called the "subdirectory" system or the "pathname structure." IBM made DOS 2.0 so that it would work the same way with fixed disks or floppy disks, allowing all users to experience its heightened performance.

Tree Climbing

The best way to understand the manner in which DOS 2.0 is structured is to

Volume in drive A has no label

Directory of A:\

COMMAND	COM	17664	3-08-83	12:00p
ANSI	SYS	1664	3-08-83	12:00p
FORMAT	COM	6016	3-08-83	12:00p
CHKDSK	COM	6400	3-08-83	12:00p
SYS	COM	1408	3-08-83	12:00p
DISKCOPY	COM	2444	3-08-83	12:00p
DISKCOMP	COM	2074	3-08-83	12:00p
COMP	COM	2523	3-08-83	12:00p
EDLIN	COM	4608	3-08-83	12:00p
MODE	COM	3139	3-08-83	12:00p
FDISK	COM	6177	3-08-83	12:00p
BACKUP	COM	3687	3-08-83	12:00p
RESTORE	COM	4003	3-08-83	12:00p
PRINT	COM	4608	3-08-83	12:00p
RECOVER	COM	2304	3-08-83	12:00p
ASSIGN	COM	896	3-08-83	12:00p
TREE	COM	1513	3-08-83	12:00p
GRAPHICS	COM	789	3-08-83	12:00p
SORT	EXE	1280	3-08-83	12:00p
FIND	EXE	5888	3-08-83	12:00p
MORE	COM	384	3-08-83	12:00p
BASIC	COM	16256	3-08-83	12:00p
BASICA	COM	25984	3-08-83	12:00p
23 File(s) 228352 bytes free				

Figure 1: A directory of our DOS 2.0 system disk.

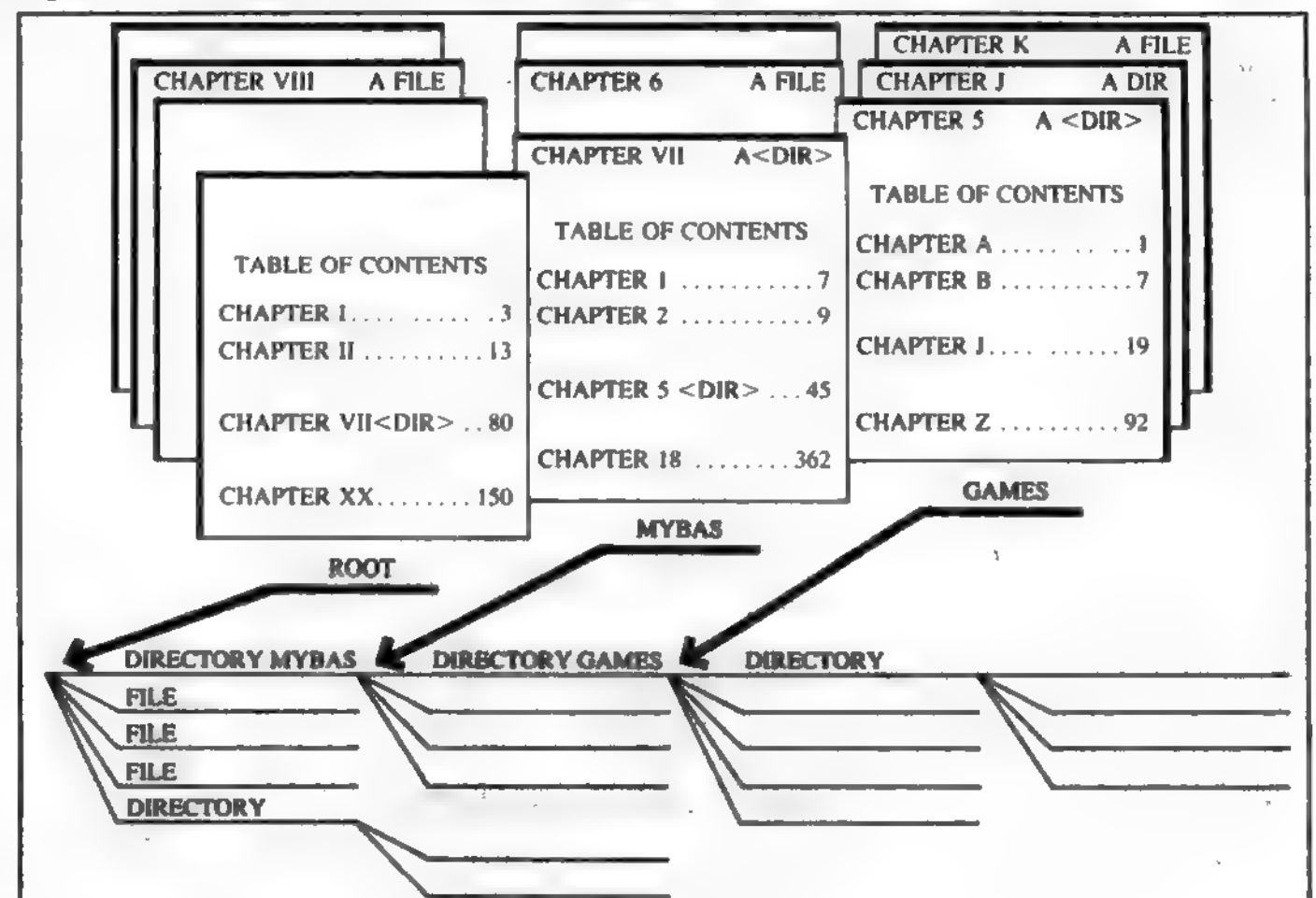


Figure 2: DOS 2.0 tree structure is like a book.

Volume in drive A has no label				
Directory of A:\				
COMMAND	COM	17664	3-08-83	12:00p
ANSI	SYS	1664	3-08-83	12:00p
FORMAT	COM	6016	3-08-83	12:00p
CHKDSK	COM	6400	3-08-83	12:00p
SYS	COM	1408	3-08-83	12:00p
DISKCOPY	COM	2444	3-08-83	12:00p
DISKCOMP	COM	2074	3-08-83	12:00p
COMP	COM	2523	3-08-83	12:00p
EDLIN	COM	4608	3-08-83	12:00p
MODE	COM	3139	3-08-83	12:00p
FDISK	COM	6177	3-08-83	12:00p
BACKUP	COM	3687	3-08-83	12:00p
RESTORE	COM	4003	3-08-83	12:00p
PRINT	COM	4608	3-08-83	12:00p
RECOVER	COM	2304	3-08-83	12:00p
ASSIGN	COM	896	3-08-83	12:00p
TREE	COM	1513	3-08-83	12:00p
GRAPHICS	COM	789	3-08-83	12:00p
SORT	EXE	1280	3-08-83	12:00p
FIND	EXE	5888	3-08-83	12:00p
MORE	COM	384	3-08-83	12:00p
BASIC	COM	16256	3-08-83	12:00p
BASICA	COM	25984	3-08-83	12:00p
MYBAS	<DIR>		6-25-83	11:48a
24 File(s)		184320 bytes free		

Figure 3: A directory of our disk shows the new MYBAS directory.

explore a disk directly from the keyboard, using different commands to manipulate the various files on it. Let's use the backup copy of the system disk that you should have made when you first started up your system.

Put your backup DOS 2.0 system diskette in drive A: and type in a DIR command on it. If the disk has not been modified in some way then you should get a display something like the one you see in Figure 1.

In Figure 1, you see all the system utilities that come with DOS, including such things as the COMMAND.COM file (which is the bulk of the code for your operating system itself), ANSI (which can make your system emulate an ASCII terminal), FORMAT and CHKDSK. BASIC and BASICA are at the end of the listing

here, but the list order may be different on different diskettes. Note that the figure says there are 23 files and 228,352 bytes

Not only can your root directory contain files, it can now contain additional directories.

still free on the disk for other programs. (Your display may be slightly different depending on how IBM has set up your diskettes.) Each file in the directory shows the number of bytes it consumes. Note that the big ones are COMMAND.COM and

BASICA.COM. Let's run the CHKDSK utility on the disk and see how many total bytes are consumed by the files:

A>CHKDSK

362496 bytes total disk space
134144 bytes in 23 user files
228352 bytes available on disk

262144 bytes total memory
237344 bytes free

As you can see, the disk has a total of about 362,000 bytes of space. (If you have a single-sided disk this amount will be halved). About 134,000 bytes are used up by the 23 user files. (Your own disk may show other values if you have added any programs to it.) A total of 228,000 bytes are still free on the disk. You can simply subtract the total bytes free from 362,000 to determine the number of bytes consumed, i.e. $362,000 - 228,000 = 134,000$ bytes used.

Note also that the CHKDSK command tells us the number of bytes of RAM that are available in this machine. In the above example, we used an XT with 262K of RAM installed. Only 237K of the 262K is free. DOS 2.0 consumes 25K of RAM.

Now that we have some statistics in our heads, let's play with the DOS file structure a bit to see what it can do.

The Root

When you formatted your original system disk with the FORMAT command, a single directory was created on the diskette. In DOS 2.0 this directory is called the *system* or the *root* directory. A root directory acts the same as the directories in all previous versions of DOS: It can hold up to 64 or 112 files, depending on whether the drive is single- or double-sided.

The secret of the DOS 2.0 system is that not only can your root directory contain files, it can now contain additional directories. More accurately, it can hold

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files which are themselves directories. These additional directories can hold additional files, and any of these additional files can be another directory, and so on. This technique is called a "tree-structured directory system".

To better understand this system, again think of the diskette as a book. Instead of files, the book contains chapters. The table of contents holds the names and page numbers of all the chapters, as the disk directory holds the names and byte sizes (and, invisibly, all the locations) of all the files on the disk. That is the way DOS 1.1 is set up. For DOS 2.0, imagine that any chapter in the book can be another table of contents. Each table of contents can contain other chapters and/or other tables of contents. (See Figure 2.) In a like manner, DOS 2.0 allows any file to be a directory. When you use the DIR command, you see file designations that look just as they should, with 8-character filenames and 3-character extensions. Directories in DOS 2.0 are indicated by the symbol <DIR>.

Accessing Directories

How are these different directories used and accessed? Almost all the commands in DOS 2.0, such as DIR, CHKDSK, and COPY, can take advantage of files that are in differently-named directories on the diskette by the use of "pathnames". A pathname is like a filename, only it is more elaborate; it indicates the name of the file and the name of the directory containing that file. It is like a map to the file; its name is made up of the names of several files. Pathnames let you organize your disk in a more sophisticated manner by allowing many directories to be created on the diskette or fixed disk at the same time—and they can be erased and moved around from one disk to another. This system is a terrific boost to the power of DOS once it's understood. As a way of understanding DOS 2.0, let's now create a single directory on our diskette and put something in it.

The MKDIR command is used for cre-

Volume in drive A has no label			
Directory of A:\mybas			
.	<DIR>	6-25-83	11:01a
..	<DIR>	6-25-83	11:01a
2 File(s) 227328 bytes free			

Figure 4: A directory of the new MYBAS directory.

Volume in drive A has no label			
Directory of A:\mybas			
.	<DIR>	6-25-83	11:48a
..	<DIR>	6-25-83	11:48a
BASIC COM	16256	3-08-83	12:00p
BASICA COM	25984	3-08-83	12:00p
4 File(s) 184320 bytes free			

Figure 5: The directory after copying two files, BASIC and BASICA, into MYBAS.

ating directories. Our original DOS disk came with no directories other than its root. Let's use MKDIR to create a directory called MYBAS (which stands for "my BASIC programs"). For now, this directory will be used to hold the two BASIC interpreters that come with DOS and are now stored in the root directory (BASIC and BASICA). Later we can add some of the games supplied on the *Supplemental Programs* diskette that comes with DOS 2.0, but we will stick to the two BASIC programs for now to make it easy for you to try out our exercises.

Enter the following command:

```
A>MKDIR MYBAS
```

The disk will whirr and buzz and finally come to a rest with the A> prompt showing. Congratulations! You have just created your first directory. Use the DIR command to confirm your success and look at the end of the listing. See Figure 3.

Very interesting! There is now a new entry on the disk called MYBAS. But where we would normally expect to see the number of bytes consumed by a file we instead see the symbol <DIR>. This symbol tells us that MYBAS is not a file

but a directory. It's a subdirectory, if you will, because it is part of the root directory. Note also that the DOS helpfully put in the date we created the directory (June 25, 1983) and the time (11:01am)—no secrets with these computers!

Now the question is, how do we use this new directory? Well, first we need to shift our location from the root directory into our new directory.

Changing Directories

The command for changing from one directory to another is called CHDIR, for "change directory." (You can also use CD, an abbreviation for CHDIR). For example, type the following:

```
A>CHDIR MYBAS
A>
```

Although nothing seems to have happened, you are actually *in* the MYBAS directory, on a new branch of the root! It is as if you moved your frame of reference from the main table of contents of the book to a new table of contents. To see what we mean, use a plain, vanilla DIR command right now. You should get the display shown in Figure 4.

What this directory shows is that no files are currently in the new MYBAS directory and that two entries are in the directory—one with one period and one with two periods. We will discuss these later, but for now you can ignore them. Note that the last line of the DIR output listing tells us that there are two files in this directory and that, in the case of this particular diskette, about 227,000 bytes are free (it may be different on your system). That is the number of bytes we had left before we created the new directory. Now look at the second line of the Figure 4 listing. It shows we are in the "Directory of" \mybas. What has the back-slash character (\) got to do with this?

First ask yourself how you would use the CHDIR command to change back to the root directory. Probably type CHDIR ROOT, right? Wrong. The root is identified in PC-DOS not by a name, but by the backslash symbol. In other words, by typing:

```
A>CHDIR \
A>
```

will put you back in the root directory and when you use the DIR command you will see all the root's files again.

The Current Directory

DOS remembers the default directory for each drive on your system. The default

directory is called the current directory, and it is the directory that DOS will search if you enter a filename without telling DOS which directory it is in. You can find out what directory you are in at any time by typing CHDIR with no name after it, like this:

```
A>CHDIR
A:\
```

CHDIR agrees we are in the root. When first booted up, DOS 2.0 will automatically use the root as the default directory unless you issue a CHDIR command.

Now let's copy our two BASIC files into the newly-created MYBAS directory and see what happens. Enter the following line:

```
A>COPY BASIC*.COM MYBAS
```

DOS will print the names of your two BASIC files and the disk will click and whir. What we did was copy the files BASIC.COM and BASICA.COM to the directory called MYBAS. If we run the DIR utility on the MYBAS directory, we get the display shown in Figure 5.

In Figure 5, we see that the MYBAS directory contains four items: the two new BASIC programs (files) and the two periods (directories).

Now let's add another directory to our MYBAS directory. First switch to the MYBAS directory using the command

CHDIR MYBAS. Then type MKDIR GAMES to create a GAMES directory. Now if you type DIR you'll see the original two files plus a new entry called GAMES <DIR>. Great! You have done your job. Go back to the root now with the command CHDIR \.

The One True Pathname

As you might have guessed, when you ask DOS 2.0 to find you a file, DOS must know two things about the file: a name for the file itself and the name for the directory the file is in. Further, since directories can contain other directories, you need to specify the complete path of directory names leading to the directory containing your file. Your path can start from the root directory or from the current directory and it can extend several levels deep.

A pathname consists of a series of directory names separated by backslash characters (\). A filename may be part of a pathname, but must be the last entry in the pathname and must be separated from the last directory name by a backslash. You must be careful when you use pathnames with DOS utilities. For example, the TYPE command used on a directory name is useless and results in the error message, File Not Found. The DIR command, however, can be used on a filename in a path, since it will simply verify that the file exists.

If you have set up your disk using the preceding steps, you can now explore the meaning of paths. Get into the root with a CD \ command. Figure 6 diagrams how the diskette is now organized.

Let's make a new directory inside the MYBAS directory to hold some BASIC games. Type:

```
A>MKDIR \MYBAS\GAMES
```

You are still in the root and want to see the contents of the MYBAS directory.

```
A>DIR MYBAS
```

says display the Mybas directory.

No backslash is required in front of MYBAS because MYBAS is part of the

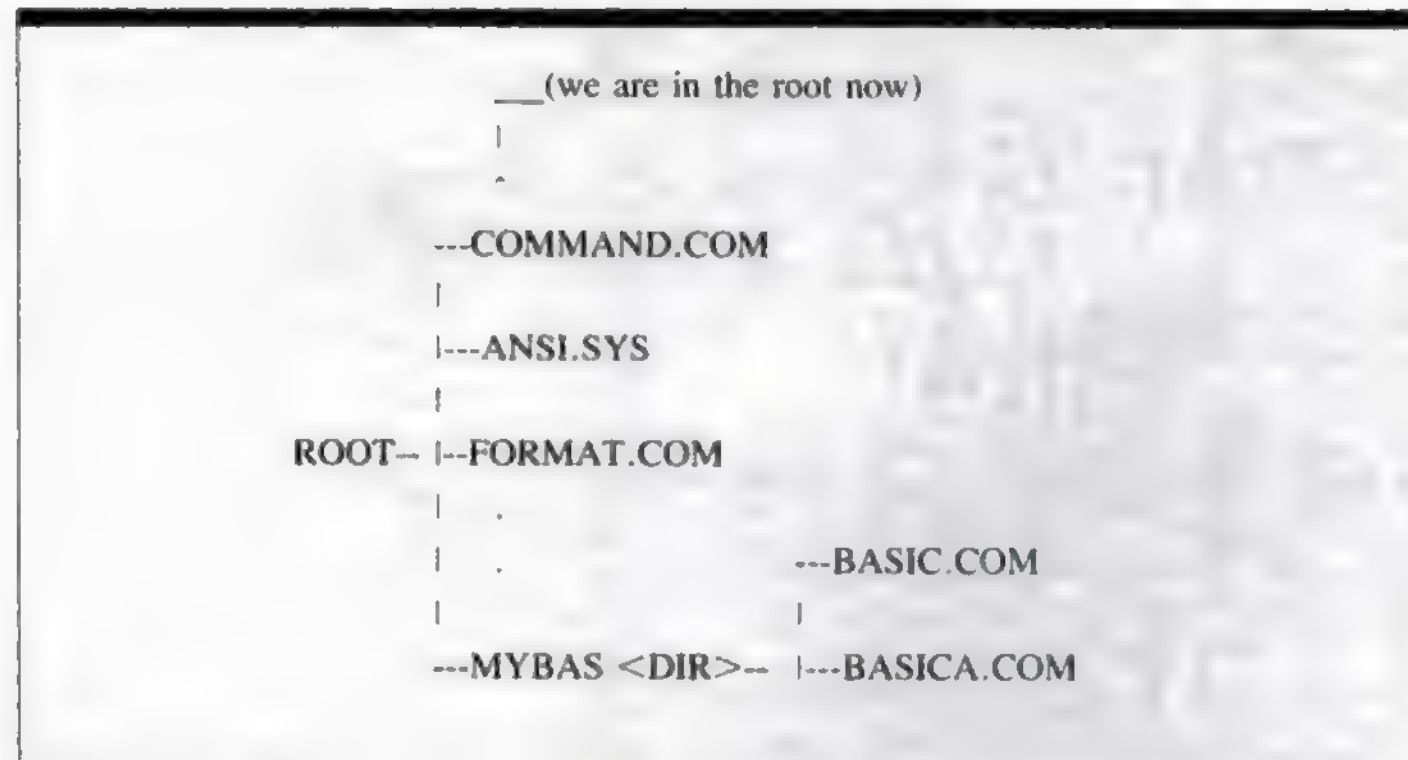


Figure 6: Organization of the disk after the exercise.

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directory that we are in. Now, what if you are still in the root and want to see the (empty) contents of the GAMES directory, which is two directory layers down from the root? You would enter:

```
A>DIR MYBAS\GAMES
```

which indicates the GAMES directory in the MYBAS directory.

Here we see a two-level pathname, MYBAS\GAMES. It starts with the directory name MYBAS followed by a backslash and then by the next directory, GAMES. Although no files are in the GAMES directory yet, to refer to one from the ROOT, you would type:

```
A>DIR MYBAS\GAMES\DONKEY.BAS
File not found
```

which means look for DONKEY.BAS in MYBAS\GAMES. (The computer responds with an error message).

You can leave the leading backslash off the pathname because we are in the root. How would we move directly into the GAMES directory?

```
A>CHDIR MYBAS\GAMES
```

means change to the GAMES directory.

If you are now in the GAMES directory and want to see its contents, you simply type DIR alone. Right? But to see the contents of the root what would you type?

```
A>DIR \
```

which reveals the contents of the root.

What would you type if you were in the GAMES directory and you wanted to see the contents of the MYBAS directory above you?

```
DIR \MYBAS
```

shows the contents of the MYBAS directory.

But IBM has provided another way to do this.

```
DIR . .
```

is a shortcut way to show the contents of the directory above.

The two periods in the DIR command

stand for the directory directly above the one you are in, in this case the MYBAS directory. IBM has included these periods as a short way to quickly access the next directory level without having to recall that directory's complete name.

Now try this:

```
A>DIR .
```

You will see the contents of the directory you are in, just as if you had typed DIR. This single period is here just to let you know that you are not in the root, but in a

subdirectory. When you are in the root, DOS will never display single or double periods.

Manipulating Paths

Now let's take this system one step further so that we can fully appreciate the meaning of levels and pathnames. Let's copy some games from the *Supplemental Programs* disk to the GAMES directory. Copy the game DONKEY.BAS and the entertainment program ART.BAS. If you don't have this disk, then use some other

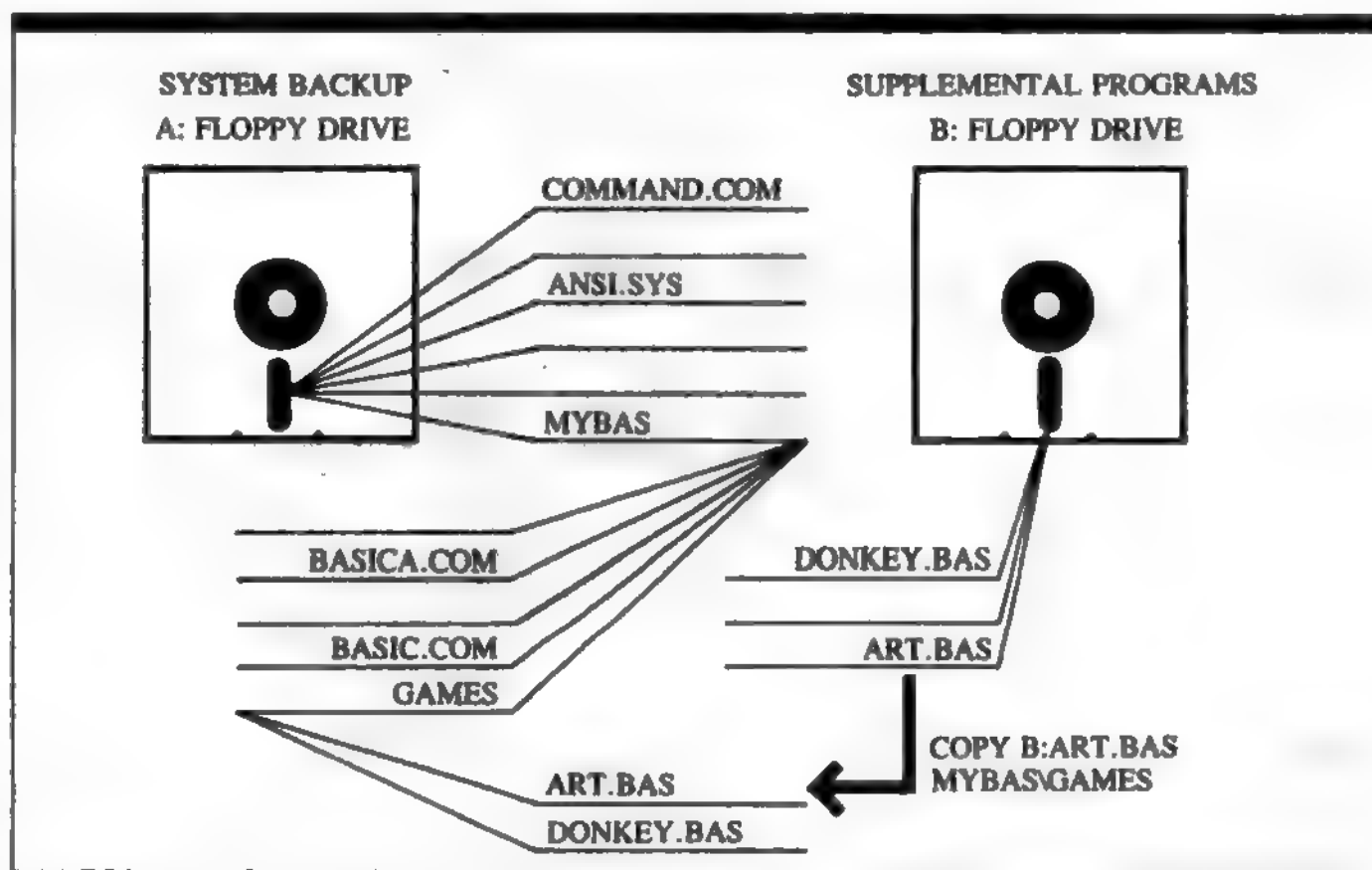


Figure 7: Files moving from one path to another.

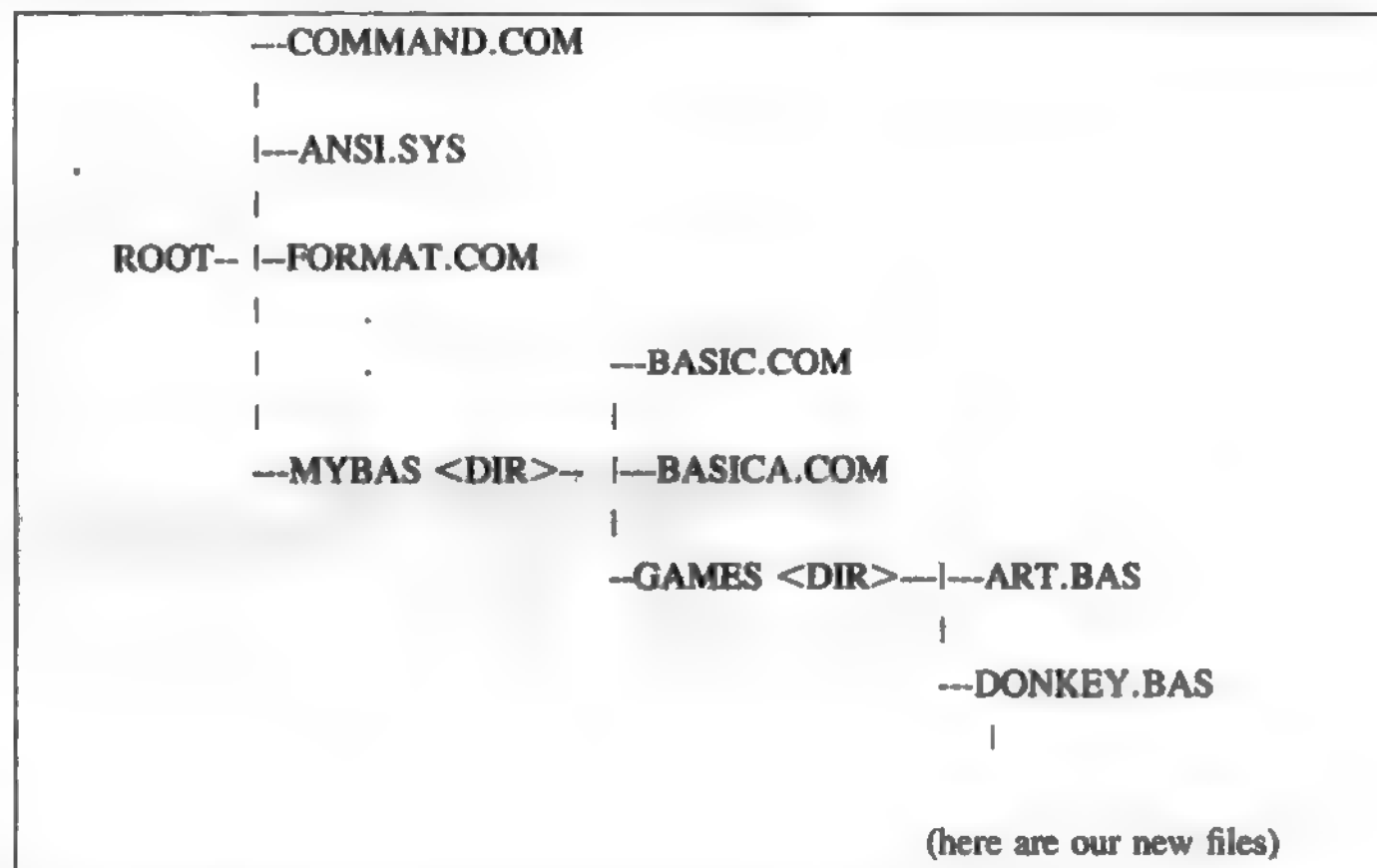


Figure 8: Organization of the diskette after using the COPY command.

file, such as EDLIN.COM, for this example.

We are in the root and the A: drive contains our system disk. B: contains the supplemental disk. Figure 7 shows how files move from one path to another.

Type:

```
A>COPY B:ART.BAS MYBAS\GAMES
A>COPY B:DONKEY.BAS
MYBAS\GAMES
```

Now run a directory of GAMES with the DIR command and check that the new files are there. You should now have the arrangement shown in Figure 8.

Now let's go a step further. Define a new directory in the MYBAS directory called FINANCE. Enter:

```
MKDIR\MYBAS\FINANCE.
```

Then copy the program MORTGAGE.BAS from the supplemental diskette in A: to the FINANCE directory in the diskette in B: with:

```
COPY A:MORTGAGE.BAS
B:MYBAS\FINANCE.
```

XT users can simply copy all these files to

the fixed disk first and then bring them back to the A drive. You should now have the organization shown in Figure 9.

There are now two directories in MYBAS: GAMES and FINANCE. FINANCE contains the program MORTGAGE.BAS. GAMES contains the games DONKEY.BAS and ART.BAS. Here is where you can show your stuff. We have switched to the GAMES directory and want to see what is in the FINANCE directory.

```
A>DIR \MYBAS\FINANCE
```

displays the contents of FINANCE.

Note that we had to use the backslash character in front of MYBAS. Since we are not in the same directory that contains the file we wish to view, we must specify the complete pathname, from the root "" to the MYBAS to the FINANCE directory. Another way to do the same is:

```
A>DIR . \FINANCE
```

which also displays the contents of FINANCE.

The two periods mean the directory

level above the one we are in. This directory is MYBAS and we know it contains the directory FINANCE.

Now let's test how well you understand the pathnames. You are in the root, as diagrammed in Figure 9. You have BASIC in the root and you want to run the program MORTGAGE without changing directories. What should you type?

```
A>BASIC
MYBAS\FINANCE\MORTGAGE
```

runs the program MORTGAGE.

Let's try one more experiment. Let's copy the program ART.BAS from the root into the FINANCE directory.

```
A>COPY MYBAS\GAMES
\ART.BAS MYBAS\FINANCE
```

Note that this process will really take a long time on your floppy disk, since DOS must search so many levels to transfer the files. Also note that we did not need the initial backslash. You can use the DIR command to check that all is well and that the files are properly transferred.

Other Forms

You should be aware of a few other forms of the COPY command. If you are in one directory and wish to copy all the files from another directory, you do not need to type *.* , the usual command for copying all files from one disk drive to another. For example, if you are in the root and want to copy into it all the files in the LOTUS directory, you might think you have to type:

```
A>COPY BUSINESS\LOTUS\*.*
```

Not necessarily. This form will work just as well:

```
A>COPY BUSINESS\LOTUS
```

At this point in the discussion, you should perceive the fantastic flexibility offered by the tree-structured directory system. Let's talk about how to get rid of any directories you might have created on a day of excessive expression.

Removing a directory is different than

```

|---COMMAND.COM
|
|---ANSI.SYS
|
ROOT--|---FORMAT.COM
|
|
|---BASIC.COM
|
|---MYBAS <DIR>--|---BASICA.COM
|
|---GAMES <DIR>---|---ART.BAS
|
|---DONKEY.BAS
|
|---FINANCE <DIR>--|
|
|---MORTGAGE.BAS

```

Figure 9: Organization of the diskette after adding the FINANCE directory.



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removing files with the ERASE command (or DEL, which DOS 2.0 also accepts). To remove a directory you must first erase all its files by typing ERASE *.* or DEL *.*. Then you get out of the directory and type RMDIR, followed by the directory name. Suppose you are in the root directory and want to remove a directory called JUNK. You would type:

```
A>CD JUNK
A>DIR
```

to check to make sure you are in the right directory.

```
A>ERASE *.*
```

means be careful, now you will erase all the files. DOS will ask you if you are sure; answer Y for yes.

```
A>CD \
A>RMDIR JUNK
```

If you forgot to erase the contents of the JUNK directory, or you forgot to go back to the root, or the pathname was incorrect, you will get a message like this:

```
Invalid path, not directory,
or directory not empty.
```

Cruising the Tree

Suppose you were handed a disk with a directory system similar to the one we have created so far. How could you quickly tell what the structure of the diskette was? You could type DIR and write down all the files marked with the symbol <DIR>, then use the CHDIR command to get to each of these and repeat this process—not a very quick method. The command TREE, however, can be used to do this entire job for you. When typed by itself, TREE lists every pathname on the specified disk drive. For each directory, any subdirectories are listed. If you type \F after TREE, you will also get a listing of the contents of each of the paths. Figure 10 shows an example of how to use the TREE command on the current disk.

Figure 10 shows what is probably the worst organized display of any of the IBM

DIRECTORY PATH LISTING FOR VOLUME ??????????	
Path:	MYBAS
Sub-directories:	GAMES FINANCE
Files:	BASIC .COM BASICA .COM
Path:	\MYBAS\GAMES
Sub-directories:	None
Files:	ART .BAS DONKEY .BAS
Path:	\MYBAS\FINANCE
Sub-directories:	None
Files:	MORTGAGE.BAS

Figure 10: Using the TREE command to list the disk structure.

DOS 2.0 utilities or commands. We assume IBM will clean it up eventually. You can also use the TREE command on any disk drive name you wish, A: through D:, if these drives are installed.

Most PC compatible software will eventually allow pathnames, even if it doesn't now. DOS 2.0 BASIC currently allows you to use the tree-structured file arrangement. You can specify a filename to BASIC that contains a complete pathname. This feature means that a BASIC program can then be run even if the BASIC.COM or BASICA.COM file is in another directory. For example, if you were located in the root and had BASICA there, you could run a BASIC program located in a distant directory. Not all commercial programs that work with DOS 2.0 allow the use of these file structures.

In DOS 2.0, you can create as many subdirectories as you wish. However, on the IBM PC you cannot have a pathname with more than 63 characters. Thus:

```
SALLY\REPORT.#23\MYBAS\FINANCE:
\MORTGAGE\BIG-TIME
\GOFORIT$FIVE!
```

would be the maximum size name. As you can see, the shorter you make the subdirectory names, the more levels in the path you can have. For example:

```
A6\0P\BI\~\&\TG\IT\GO\TO\ME\$$
\~-\%Z\ZZ\0Z\0F\MY\SO\PEX
```

contains 21 levels of subdirectories. But would you really use a structure like this? We doubt it and recommend that you stick to clear names for subdirectories and files so that your pathnames describe what you are doing.

Organizing Path Names

One more thing to consider when using the tree-structured directory system is how you can best organize it. A newly formatted floppy disk or fixed disk is rather like a bare canvas—with clear ideas you can transform it into a thing of beauty or at least make it easier to use.

Let's consider some ways of structuring a directory and some pitfalls that can arise. First, you should be aware that each time you create a new directory, DOS consumes an additional 500 or so bytes of RAM. On a 96K or 128K RAM system, this amount may not seem like much, since DOS normally only takes up about 10K RAM. But consider that if you have 50 directories, your RAM would be 25K shorter than before, which might make running some large programs impossible.

A second point to consider is the value of using pathnames with your floppy

DIRECTORY TREE

disks. You should only use pathnames on floppies when it is important to keep many files on one disk. One such instance might be an application program with lots of overlays or modules that must always be moved around with the main .COM program. Placing all these overlays in a separate DOS 2.0 directory would unclutter the root. Figure 11 is an example of a typical layout for a DOS 2.0 diskette. What we've done is let the root contain the utilities that come with DOS, such as FORMAT.COM, CHKSDK.COM, and DISKCOPY.COM. This way we always know that the default directory contains IBM's basic software tools.

The root also contains three directories, BUSINESS, PERSONAL, and WORD. These directories are marked with the symbol <DIR> so you know they are not simply files. The Business and Personal directories are separated so that you can

use one disk for both purposes and not get them confused. You may choose to use a separate disk for personal files, but many people like to just start writing without having to fetch a new disk.

In DOS 2.0, you can create as many subdirectories as you wish.

The third directory, WORD, holds all your word processing programs (for example, including WS.COM for *WordStar*, an indexing program, and a spelling checker). This directory is a cluster area, a sort of bottom floor parking lot for all your writing tools. Not everyone would do it this way, but for our example, it works. Under the BUSINESS directory we have

created three more directories: LOTUS, IBM, and ATT. Within each business directory we keep the bulk of files associated with that company and all the people in it. In our LOTUS directory we have two additional directories which are called PROPOSAL and MODEL. MODEL <DIR> contains the spreadsheet program 1-2-3. PROPOSAL <DIR> contains the letter MORGAN.

Now think about using this directory system. The first thing you'd ask when you fired up the computer in the morning would be: "Where was the file I was working on yesterday?" You should have written the name of that file down. If you didn't, you would use the TREE command to obtain a brief map of the disk. Let's say you did remember that you were working on a file in the LOTUS\PROPOSAL directory called MORGAN.LET. You want to finish some light editing on it

```

--PROPOSAL <DIR> --MORGAN.LET
|
--COMMAND.COM  --LOTUS <DIR>-- |--SHULTZ.LET
|               |               |
|---BUSINESS <DIR>-- |--IBM <DIR>  --MODEL <DIR>--|--123.EXE
|               |               |
|---FORMAT.COM  --ATT <DIR>
|
|---DISKCOPY.COM
| :
| :
|---TREE.COM    --FAMILY <DIR>--|--DEAR.DAD
|               |               |
|---PERSONAL <DIR>-- |--WS.COM    --BIRTHDAY.LST
|               |               |
|---WS.COM       --POEMS <DIR>
|               |
|---EDLIN.COM    --WS.COM
|               |
|---WORDPROC <DIR>-- |--SPELL.COM
|               |
|               |--INDEX.COM
|               |
|               --THESAUR.COM

```

Figure 11: Example of a simple structure for a DOS 2.0 directory.



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DIRECTORY TREE

and then mail it. What must you do first? Well, you need to get MORGAN.LET into the word processing program WS.COM since you are in the root and WS.COM is there with you. You could type the line below

```
A>WS BUSINESS\LOTUS\PROPOSAL
\MORGAN.LET
```

which puts MORGAN into *WordStar*.

But that command is kind of cumbersome, isn't it? Instead, we will switch into the directory BUSINESS\LOTUS\PROPOSAL with this step:

```
A>CD BUSINESS\LOTUS\PROPOSAL
```

which changes us to the PROPOSAL directory.

Then we would copy WS.COM and its overlays into this directory with the command COPY. Finally, we would type:

```
A>WS MORGAN.LET
```

which puts MORGAN into *WordStar*.

Once you are in the BUSINESS\LOTUS\MORGAN directory you can use all the files in it without having to use pathnames. But if you now want to use a file that is in another directory, you must first change (using CHDIR) to that directory, then type the pathname followed by the name of your particular file. For example, suppose you are still in PROPOSAL <DIR> and wanted to use the SPELL program that is stored in the WORD directory. You would have to change to the word directory with the command CD \WORD. Then you could type:

```
A>SPELL
\BUSINESS\LOTUS\PROPOSAL
\MORGAN.LET
```

which checks the spelling of the MORGAN File.

Problems and Pitfalls

Such long pathnames may disturb you. There is a solution: Put a copy of the word processing program in the directory you are using at any particular time. The drawback to doing this is that each new version

of the word processor consumes disk space. Thus a program that consumed 90K (not unusual for a word processor), if present in two directories on your 320K diskette, would leave only 140K for other files! So you would certainly have to copy and erase the word processing program

A newly formatted floppy disk or fixed disk is rather like a bare canvas—with clear ideas you can transform it into a thing of beauty.

from the directory each time it was used. Furthermore, when you make such a copy, the original program is still intact in the root, taking up useful space. Of course, if you have a hard disk, you probably would not even miss the memory consumed by 10 copies of a 90K program (they would only consume 10 percent of your 10 megabytes).

Another solution to the pathname problem is to copy the text file you wish to edit from the deeper level directory into the root, or into the directory where the word processing tools lie. Then, when you have finished editing it, put it back in its original parking lot for safekeeping.

An even more pragmatic method is to let all kinds of junk files build up in the root: letters, spreadsheet models, BASIC programs. Every so often, copy these files into the associated directory and erase the copy in the root. Don't build such a complex multilevel directory system that you spend too much time moving around among the levels. Fixed disk owners can manage more complex directory systems.

If you want to learn more about pathnames, you can consult one of the many books on the Unix operating system. IBM borrowed most of its ideas for DOS 2.0 from Unix. ■

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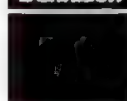
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The E.H. Boeckh Company has developed a program allowing the underwriters and insurance carriers who subscribe to its database of building construction costs to use PCs for data entry and storage.

The daily operations at the E.H. Boeckh Co. probably would baffle its founder.

Fifty years ago when Colonel E.H. Boeckh started the Milwaukee firm to provide building cost information to the insurance industry, words like *computer*, *electronic telecommunications*, and *software*

PC MAGAZINE • JUNE 12, 1984



Your Boeckh and Call

were unknown. Besides, the cantankerous retired officer from the Army Corps of Engineers was doing fine using tried and true methods. He manually compiled details on construction costs around the country, printed the information in the traditional format, and mailed it to clients.

Thanks to IBM PCs and mainframes

from both IBM and Honeywell, that painstaking process is gone at the firm that bears the late colonel's name. E.H. Boeckh Co. is now a division of American Appraisal Associates Inc., and PCs grace the firm's downtown headquarters overlooking Lake Michigan as well as the offices of many of its clients, who are pri-

marily insurance carriers. The mainframes belong to General Electric Information Services (GEIS), the world's most extensive commercially available teleprocessing network.

"This is an information business, and information is the name of the game," explained Telefore P. Wysocki.

CONSTRUCTION COSTS

Boeckh's system sales manager.

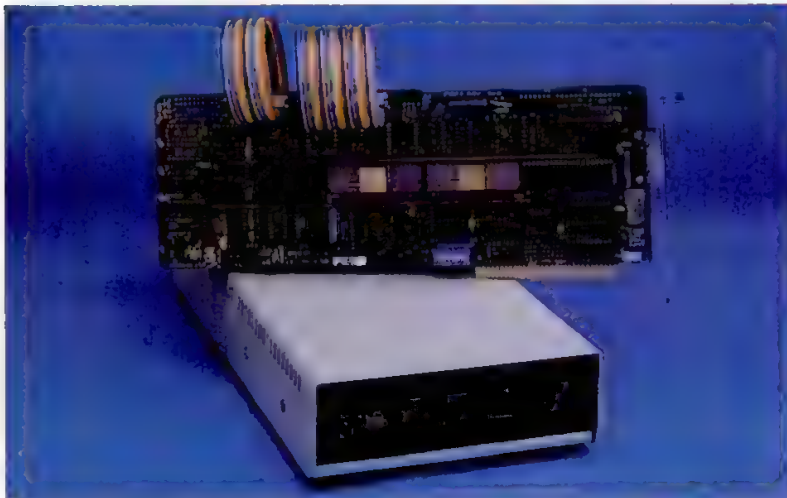
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Shaky Steps

Boeckh took its first step into the electronic age about 5 years ago when the company tried to set up an in-house computer system to handle its vast amounts of information, company president George B. Trimmer, Sr. explained. That effort failed, as did another attempt with a teleprocessing company. Boeckh eventually turned to the time-sharing system operated by GEIS, a subsidiary of General Electric, said Trimmer. GEIS is an integrated telecommunications system with mainframes in Maryland, Ohio, and the Netherlands.

In the insurance context, the current system allows a carrier or underwriter to access Boeckh's building valuation system using a modem-equipped terminal. This system is part of the GEIS software library of more than 2,000 programs. At one end is the user information on a building, including location, size, use, and materials. At the other, the Boeckh-authored program housed in the GEIS mainframes calculates costs and transmits a report.

Until recently, only dumb terminals

CONSTRUCTION COSTS



Boeckh eventually turned to the time-sharing system operated by GEIS, a subsidiary of General Electric.

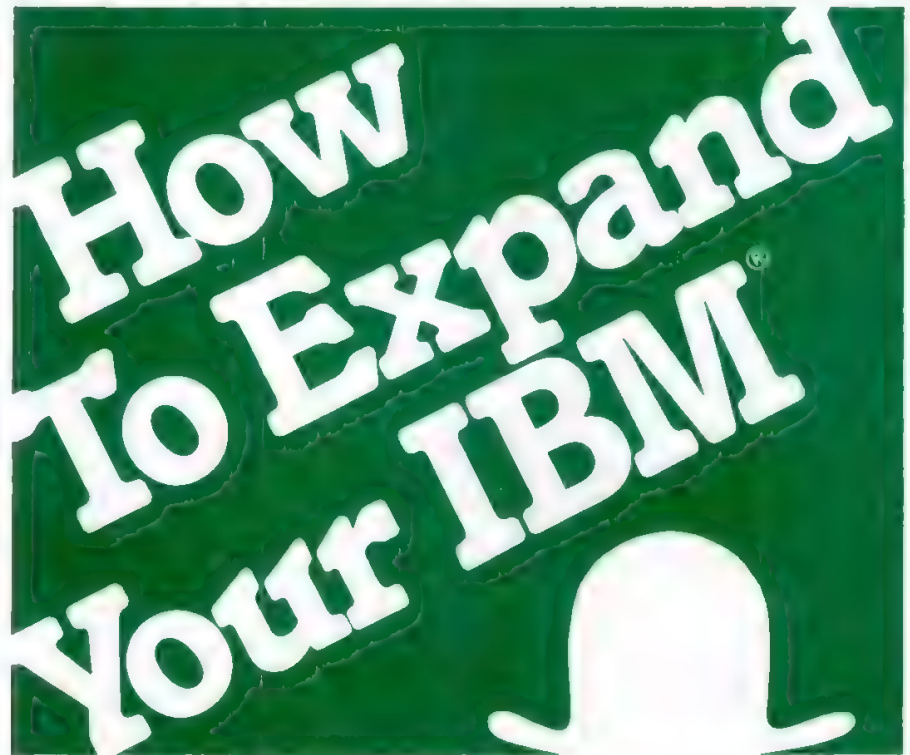
could access the Boeckh program. This limitation created two principal drawbacks for clients. It required them to remain on-line with GEIS while entering all data, and that meant higher bills for connect time. In addition, the terminals weren't useful for other office purposes.

PCs, XTs, and PC-compatibles could help remedy those drawbacks, Boeckh officials believed. They decided that their

customers should be able to use microcomputers as intelligent terminals to access the GEIS host and for such purposes as word processing, financial analy-

sis, local database management, mailing list maintenance, and networking.

So in the fall of 1983, Boeckh's four-member programming staff started work



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CONSTRUCTION COSTS

and selects async communications and printer ports. The setup process is generally performed only once.

Although the program runs on either a PC or XT, there are differences in disk configuration. The users' manual includes setup recommendations for the PC's two floppy disks and the XT's hard disk.

To Begin

Item 1 on the master menu offers four screens for the insurer or underwriter to enter data. While most of the questions are optional, certain fields, marked by asterisks, must be filled in, including the building's zip code, number of stories, construction class, and floor space. One of 71 occupancy codes must be selected, with choices ranging from department store, cinema, high-rise office, and warehouse to convent, natatorium, funeral home, and "fast food restaurant without seating."

The more questions answered, the more precise the financial calculations will be. "Each optional variable enables the program to refine the estimate from the models," Wysocki said. Those options include climatic region, building age, construction quality, floor and ceiling finish, roof pitch, number of passenger and freight elevators, exterior wall material, type of heating, cooling and electrical systems, and whether a sprinkler system has been installed. The scope of potential variables can be broad; for example, the system offers 16 roofing materials to choose from. Moreover, if the roof includes any combination of these 16 materials, then linked fields on the screen allow the user

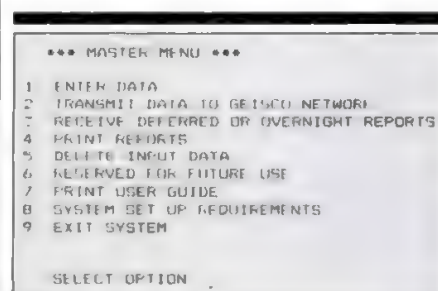


Figure 1: Master menu for E.H. Boeckh's PC data entry program.

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POLICY/ID NUMBER:	ABC123456	12/84 COST AS OF: 03/84
PROPERTY OWNER:	JOHN JONES	
PROPERTY ADDRESS:	1234 OAK STREET CHICAGO, IL 60627	
BUILDING DESCRIPTION - SECTION 1		
Occupancy:	101 APARTMENT, LOW RISE	
Construction:	Masonry Non-Combustible	
Number of Stories:	6	
Gross Floor Area:	25,000 SQUARE FEET	
Construction Quality:	2.5	
Year Built:	1965	
Wall Openings:	25 %	
Total Perimeter:	2,500 FEET	
Average Story Height:	12 FEET	
Climatic Region:	COLD	
Effective Age:	17 YEARS	
Condition:	2	
Depreciation Percent:	10 %	
COMPONENT (ARCHITECT FEES OF 7.0% ARE INCLUDED) BASE COST LESS EXCL. EXCLUSION COST		
Site Preparation		538
Foundation Wall		31,041
Interior Foundations		2,714
Slab on Ground	9,628	
Framing	106,611	
Exterior Wall	256,926	
50% Wood Siding On Studs		
50% Metal or Other Siding on Studs		

(Figure 2)

to enter the percentage of each one.

Filling in options for architect fees, percentage of profit, and overhead will override the industry standard already included in the model as a default. If the building has an unusual feature, such as a loading dock, it can be entered on the final data entry screen.

Although the software is most likely used in offices by clerical or professional staff entering data from worksheets and files, it can be a valuable tool in the field for inspectors, loss control engineers or agents equipped with IBM-compatible portables, Wysocki said. When Wysocki travels, he uses a Compaq to demonstrate the program to potential customers.

Transmitting data is simple. Selecting Transmit Data from the master menu triggers a submenu with three choices: express, deferred or overnight service.

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100% Acoustical Tile		
Partitions - 500 Feet	17,505	
Material - 100% Studs, Girts		
Finish - 100% Drywall		
Plumbing - 75 Total Fixtures	102,085	17,117
Heating	21,451	
75% Electric Baseboard or Wall Units		
Cooling		
100% None		
Electrical	78,000	
Built-ins	28,107	
Other Building Services	211,710	
2 Passenger Elevators 1 Freight Elevators		
100 % Automatic Fire Detection System		
<hr/>		
BASE SUBTOTAL	1,164,020	48,211
LOCATION MULTIPLIER	1.2	1.23
LOCAL REPLACEMENT COST	1,431,745	
LABOR ADJUSTMENT (1.15)	1,646,507	62,100
DEPRECIATED COST	1,431,356	61,000
<hr/>		
TOTAL SECTION 1	1,481,856	
<hr/>		

Figure 2: A printout of a report from Boeckh's building cost modeling program.

With express service, the most expensive option, the GEIS host immediately calculates what's needed and returns a report to the user's printer. Deferred service produces a report within 1 hour. Reports are available the following morning through the least expensive option, over-night service.

With the Print Reports option from the menu, the user can order up to nine copies. The printout, as seen in Figure 2, includes the building description and the estimated replacement cost of its various components. The report itemizes expenses not considered part of the replacement cost, such as site preparation and foundation walls, but excludes land value.

A menu utility allows the user to delete data from the disk. For safety, that option includes a warning message, "This Input Data Has Not Yet Been Transmitted,"

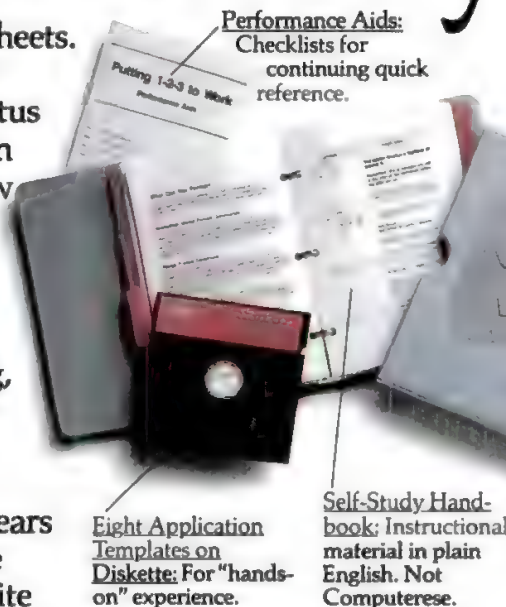
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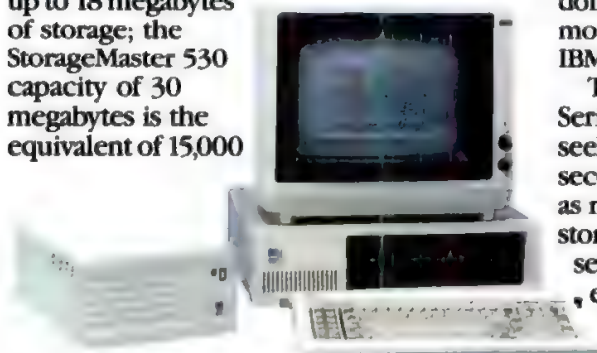
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grow as the insurance industry becomes more comfortable with microcomputers. "It's an evolutionary thing. Most of our potential clients still use paper," Mor-

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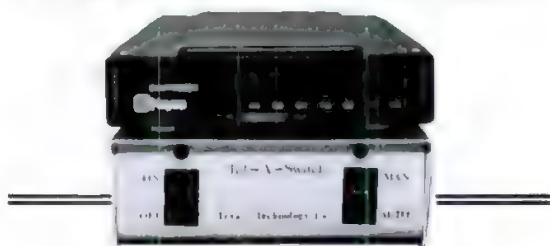
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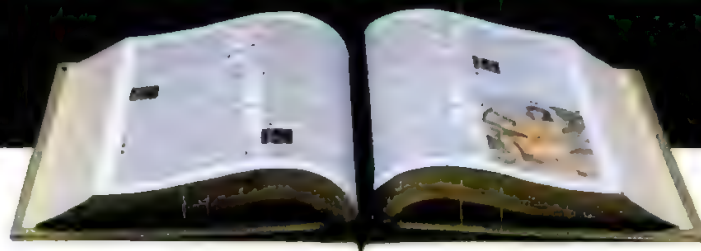
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PCFile

PCFile is not the same as *PC-File*, the well-known freeware data manager by Jim

Button. This *PCFile* is a menu-driven “electronic file cabinet” with which you can store up to 200 lines of text in each entry. Retrieval is by key words, entered in a line separate from the text. You can get up to 1,700 entries on a double-sided, double-density disk if the records are very short, but expect about 580 entries per disk if they average five lines apiece. *PCFile* can be used with such text files as bibliographies, notes, short articles, information on real estate or collections, memos, and recipes.

The *PCFile* system disk, which is not copy-protected, comes with a sturdy, colorful, 6- \times -9-inch plastic folder of instructions. The documentation for *PCFile* is short and simple, but adequate. A six-page brochure gives instructions to first copy the DOS system files to the PC

PCFile

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Recommended: Hard disk for large files.

CIRCLE 722 ON READER SERVICE CARD

TWO TEXT MANAGERS

File disk by running a batch file called DOFIRST, and then provides a run-through of the major menu options: Create a New Entry, Edit Entries, Delete Entries,

Print Entries, Pick (select) Entries by Key Word, Pick by Number, End Program, Restart, and Help.

These nine options are also numbered

and displayed on the monitor as a menu, layed out like a numeric keypad. The name of the currently accessed file of text entries is given just below the "keypad." You choose a menu option by pressing the appropriate number. A four-page folder that comes with the documentation is a beginner's introduction that guides you through the major options while working with a sample text file of ten jokes provided on the PCFile disk.

Cheerfully following the tutorial, I selected option one, "print entries." I was able to choose whether to output the joke

PCFile is an electronic file cabinet in which you can store 200 lines of text.

file to the terminal, to the printer, to the terminal first and then the printer, or to a disk file. I could display either key words only or both key words and text.

On the monitor, each of the jokes (most not very good) appeared in numbered sequence. The question "Continue (y/n)?" appeared after each joke as they scrolled up from the bottom of the screen. The joke entries were separated by a dotted line, and the key words appeared with the number of the entry on the first line.

Sending the jokes to the printer was easy, but there was no way to stop the printer short of switching it off. Additionally, no special printing control instructions could be sent to the printer, either through PCFile itself or embedded commands. Since this meant I could not set the left margin and perforation skip, I counted it as a definite drawback.

The option of viewing each entry first before printing was convenient. I could print an entry or pass it by. But I had to examine every joke in the file, answering the question "Print? (y/n)" to print the

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one good joke (about President Coolidge). In other words, in the browse-then-print mode you must go through the whole file before you can exit, short of a warm boot. A fourth choice under the "print" option creates a separate ASCII disk file of all the entries using the original or an assigned file name. (This fourth choice is not in the *PCFile* documentation.)

Creating an Entry

Deciding to add a joke of my own to the file, I selected Create option 7 of the main menu, a New Entry. I was informed that there were ten joke entries so far, and that I should enter a key word list with a maximum of 65 characters on a single line. I chose these key words:

wheels flies garbage truck

It is unfortunate that key words must be entered in *PCFile* before the body of the text because, of course, it is easier to decide on appropriate key words while looking at the text. After pressing the Enter key, I found myself in the thick of things. I could now enter text, ending the record with a !E marker. I could also back up to the last entered line to make corrections or modifications by typing !G, and I could retrieve and enter as a text entry the ASCII contents of a different disk file by typing !GET followed by the file name.

PCFile thus allows its users to enter text with a simple line editor, including word wrap. Up to 200 lines may be accommodated in each text entry, although the number of key words even for a long entry must still fit on one 65-character line. For short entries, the *PCFile* direct-entry method suffices, but longer entries can be created separately with your regular word processor, one entry per disk file.

The file transfer GET function of *PCFile* works fine with ASCII text files, but the specially modified text produced by *WordStar* is unreadable. Another small annoyance is that the GET command line remains at the beginning of the newly created entry when it is displayed or printed.

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TWO TEXT MANAGERS

(This line can, however, be deleted in the "edit entries" mode.)

Fetch!

Entries can be retrieved either by entry number (if you can remember it) or by key words. You can choose to look for entries that are associated with a specific key word, or you can use multiple "and" or multiple "or" searches (but not both at the same time). If two or more key words are linked by "and", *PCFile* will retrieve each entry in which all of the linked key words appear. A search with two or more key words linked by "or" will retrieve any entry containing one or more of those key words.

You can instruct *PCFile* to recognize or ignore differences in upper- and lowercase characters in the key words and text. Output from the search can be sent to printer, screen, or a separate disk file, either pausing after each entry or with continuous output of all entries found. When output goes to screen without instructions to pause, however, the output zips past your eyes and the main menu pops up before you have caught more than a glimpse of the entries found in the search.

I created an entry of more than 100 lines of text with the *PCFile* word processor without much trouble, then retrieved this record by searching for a key word. There was no problem in displaying the text on screen or in printing the entry.

Deleting entries is easy, but you must first determine the entry number, either by browsing through the whole file on screen after selecting the Print Entry option or by retrieving the entry with the appropriate key words first, at which time its number is displayed along with the text.

Editing with PCFile

Editing an entry after it has been entered and stored requires the file entry number. Beginning with the line of key words, the entry is displayed one line at a time in high intensity (boldface on a monochrome monitor). You can accept the line as it is by pressing Enter, or mod-

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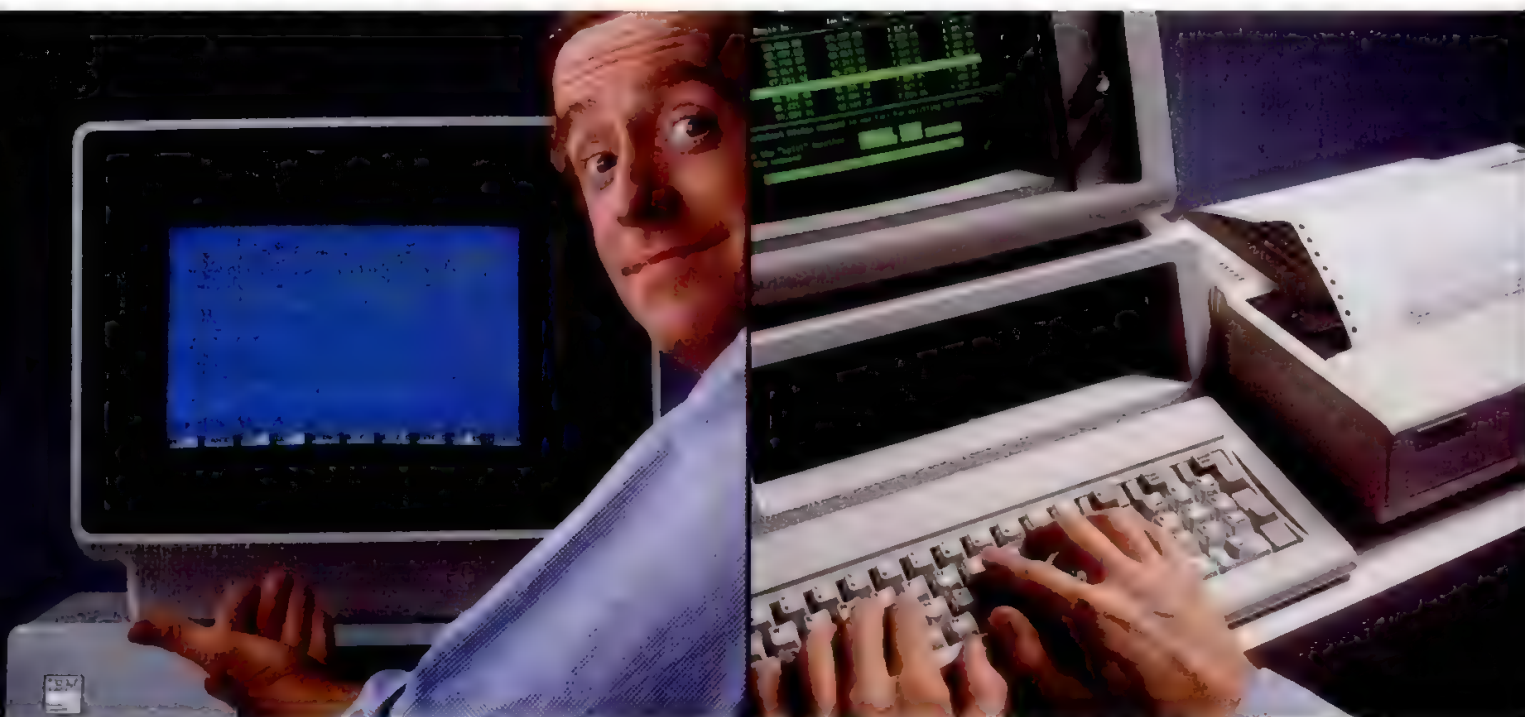


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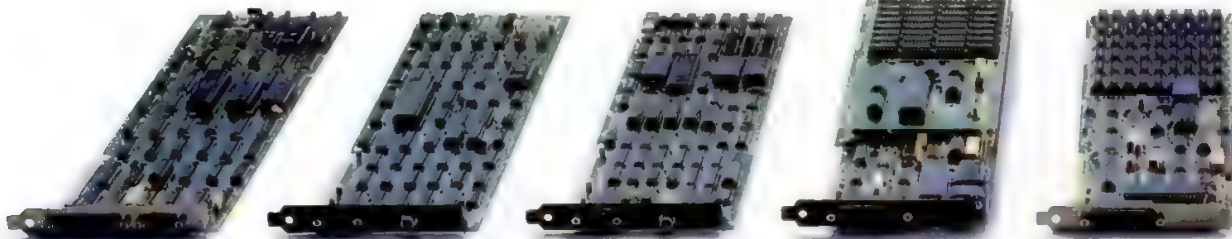
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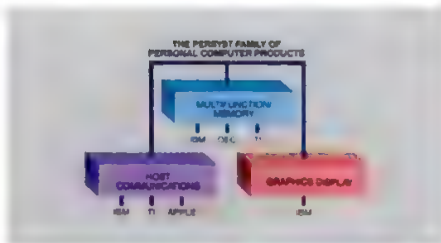
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631	2-16-84	3:56a
280	2-22-84	11:24a
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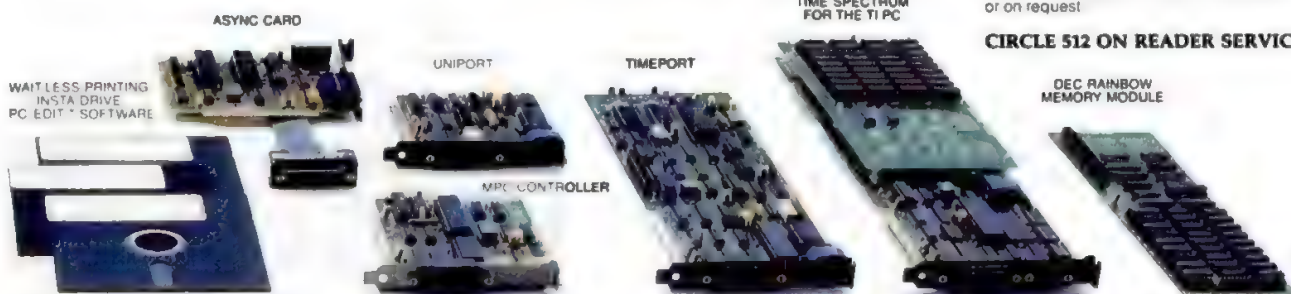
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TWO TEXT MANAGERS

ify it by retyping a new version of the line (not to exceed 65 characters) below the highlighted line. When you are finished viewing and either changing or accepting the lines of the entry, the program asks you if you want to edit another entry or return to the main menu. There is no way to skip about the text entry and modify lines at will. But, in most cases *PCFile* entries will be short, so the lack of a quit function in the editing mode shouldn't create a problem.

The Restart option on the main menu asks which disk—A or B—is to be used for data storage. Apparently, a third or fourth drive is not supported by *PCFile*, and, to be used, a hard disk would have to be configured as drive A: or B:.

The Help function that produces a one-screen display of "helpful hints" (most already covered in the documentation) is largely unnecessary because of *PCFile*'s simplicity. The Help screen, however, includes a menu that gives you a chance to delete a whole text file without having to go to DOS. This feature is not mentioned in the documentation.

PCFile is an inexpensive text management package and, although there are no frills and some options are limited, I found

no significant bugs or problems. *PCFile* will accommodate entries of up to 200 lines and provides for text entry either within *PCFile* itself or through a GET function for ASCII files created on a word

**FYI 3000 is fast,
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processor. Since the documentation did not list all of the package's functions, an improved version of *PCFile* might be on the way.

FYI 3000

FYI 3000 is a rewritten version of FYI's *Superfile* with greater speed of information retrieval, larger capacity (up to 65,000 key words per database on hard disk, and up to 20,000 on double-sided disks), the ability to index every word in text files, and additional features that make it flexible and easy to use. Written in a FORTH-like language developed at

FYI, this text-oriented data manager is extremely fast, with search speeds up to 200 entries per second on a floppy disk. *FYI 3000* is different from *PCFile* in that an internal word processing function is not provided—you have to use a separately purchased word processor to create entries. You can, however, put many text entries on one disk file. *FYI 3000* will search either for user-selected key words, as *PCFile* does, or by using every word in the text as a key word. And *FYI 3000* is more flexible in terms of output. All this power and flexibility has a price, however—*FYI 3000* costs more than five times as much as *PCFile*.

FYI 3000 is targeted largely at scientists, managers, and researchers, and, in keeping with this audience's needs, the documentation clearly emphasizes content, not good looks. The manual consists of about 100 photo-copied 8-1/2-X-11-inch softbound pages. It includes lucid, well-organized discussions of the tutorial disk, how to set up a filing system, search options and procedures, output instructions, and how to run *FYI 3000* with a hard disk. An appendix presents customization features, a glossary, a good troubleshooting and error message sec-

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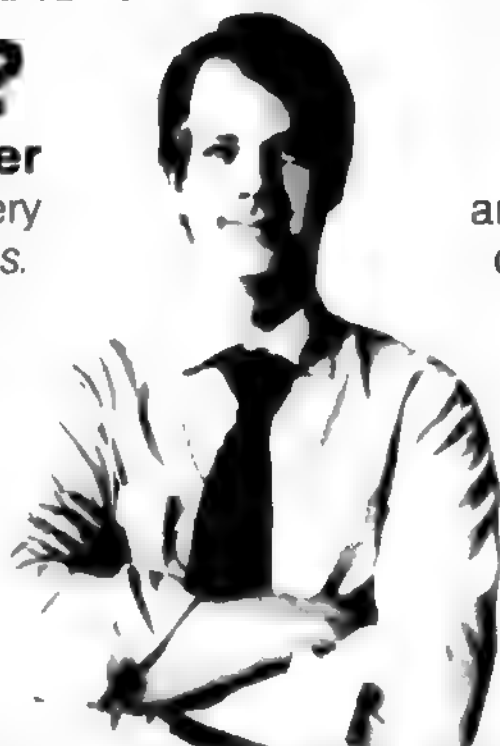
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TWO TEXT MANAGERS

tion, and an index. A ziplock bag containing three disks—one tutorial and two copy-protected system disks (one a backup)—was taped to the inside back cover.

Menus Within Menus

FYI 3000 is fully menu-driven. There are so many options, given in series of menus nested within menus within menus,

that at first you may fear losing control of the program. But the multifarious options become familiar with use. The function keys are used in making menu selections, and it is possible to move quickly through a long series of menus with the help of brief, clear descriptions of the choices.

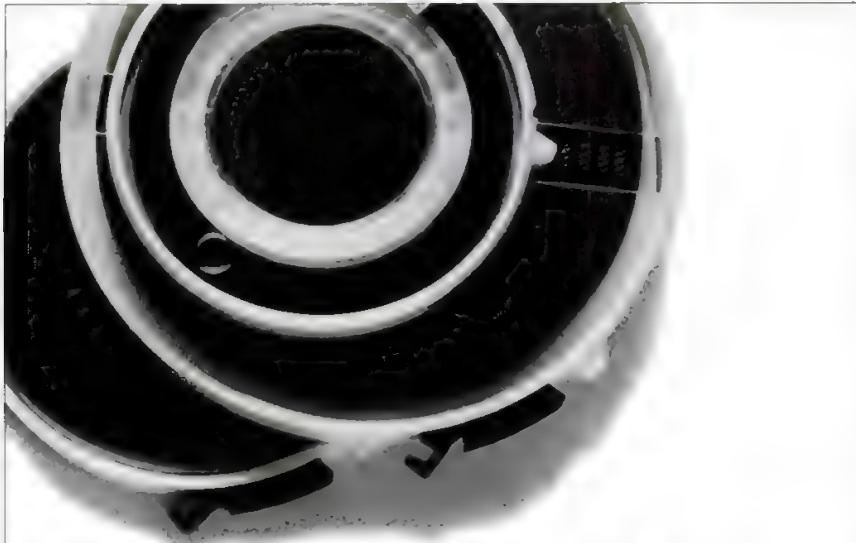
The length of time *FYI 3000* needs to create a new system can be a strain on the user.

Some menus that appear often show only the first letters of the option phrases, but entering a question mark produces the complete menu. Occasionally, the function keys are toggles, which slightly changes the wording of menu options (changing OFF to ON, for example), and you may quizzically tap a function key a few times before you notice this.

The tutorial disk was easy to work through, and, with a good idea of the *FYI 3000* menu system in mind, I went right ahead to develop my own customized file system. I used disk files already prepared with my word processor, *Volkswriter*, but *FYI 3000* will also work with files produced by *Benchmark*, *EasyWriter II*, *FinalWord*, *Perfect Writer*, *WordStar*, and a wide variety of other word processing programs.

The start-up menu allows you to customize printer and disk options, create a new filing system, select another text file disk drive, or exit the program if you're finished. (Options to quit or undo menu selections are provided throughout *FYI 3000*, which makes it especially easy to work with.) If drive B: has an *FYI 3000* text file disk in it, a fifth option will appear on the start-up menu that says "access filing system titled:" followed by the name of the file.

Through a secondary menu, I customized my printer to set the column width,



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page length in lines, number of lines to skip between pages, and left margin width. The same option allowed me to set up those disk drives that may be accessed by *FYI 3000*—any combination of A through P!

Three Entry Formats

Each *FYI 3000* filing system may have one to many text entries in each disk file. Up to 100 text files can be put on each disk, and up to 255 such disks can be concatenated into a large system to be indexed as one unit. For any one filing system, all the text entries must be set up with a separately purchased word processor in one of three ways.

In the first, each entry consists of a single paragraph of no more than 500 words, with blank lines separating the paragraphs. Every word in the text will be indexed as a key word. These text entries could be used for such things as recipes or bibliographic citations. With the second method, entries may contain blank lines. The entries are set off from one another by a *C marker at the beginning and a *E marker at the end. Maximum entry length is 500 words, and every word is treated as a key word. Typical entries for this kind of filing system would be letters brief memos, or other short documents requiring internal blank lines.

With the third method, entries may contain blank lines and be up to 2,000,000 characters in length. Again, *C and *E markers set off each entry in the file. Key words, however, must be placed in a separate area marked by a *K. There may be up to 500 key words for each entry, and in this case either a word or a phrase can be treated as a key word.

This filing system is best for lengthy documents or text filing systems in which tight control must be exercised over selection of key words. The fewer key words *FYI 3000* has, the faster it will retrieve and index entries. Therefore, *FYI 3000* lets you create an optional "omit list," a disk file of words that are excluded from the index of any particular filing system.

Omitted words include prepositions, articles, pronouns, and other common words generally considered extraneous for text retrieval.

From the main menu, I opted to create a new filing system. I had placed in drive B: a disk with six disk files of text totaling 111,879 bytes, which I had divided into

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TWO TEXT MANAGERS

94 entries, each marked with *C and *E at about 300- to 500-word intervals. I instructed *FYI 3000* to use the second of the entry marking methods, and not to recognize upper- and lowercase distinctions in the text. All options up to this point were selected from menus by pressing the function keys.

Then prompts asked for a title for the filing system (up to 40 characters), the date, an optional comment line (up to 64 characters), and an 8-character name for the index files that would be created by *FYI 3000*. I opted to put the index files on the disk in drive B:, (although it is possible to keep the index files on a different disk than the entry files). The files I used were about a foreign language, so I decided not to use an omit list.

FYI 3000 then asked whether the text files were on a floppy or a hard disk (I was using a floppy), and showed a directory of my file disk. I indicated which (all six) of the disk files I wanted to chain into an *FYI 3000* filing system. After one last pause to allow me to reselect those files I wanted to use, or exit the program and not create a filing system at all, *FYI 3000* proceeded to create an index file of key words (every word in my text files, in this case) and put together vocabulary file of all key words in the entries with a count of how many times each was used in the system. This process took 18 minutes, 4 seconds, with the words "working" and "still working" appearing on the display occasionally to keep my interest up. Then the actual number of entries in the files was displayed on the screen. A last screen display gave information about the newly created text file system: system title, date last modified, comment, markers defining entries, number of entries, type of key words, number of key words in system, and total number of words in the system.

I created another filing system from a 28,353-byte text file of 90 paragraphs, each separated by a blank line, in which each paragraph was treated as an entry and all words were treated as key words. This was just as easy to prepare as a text file



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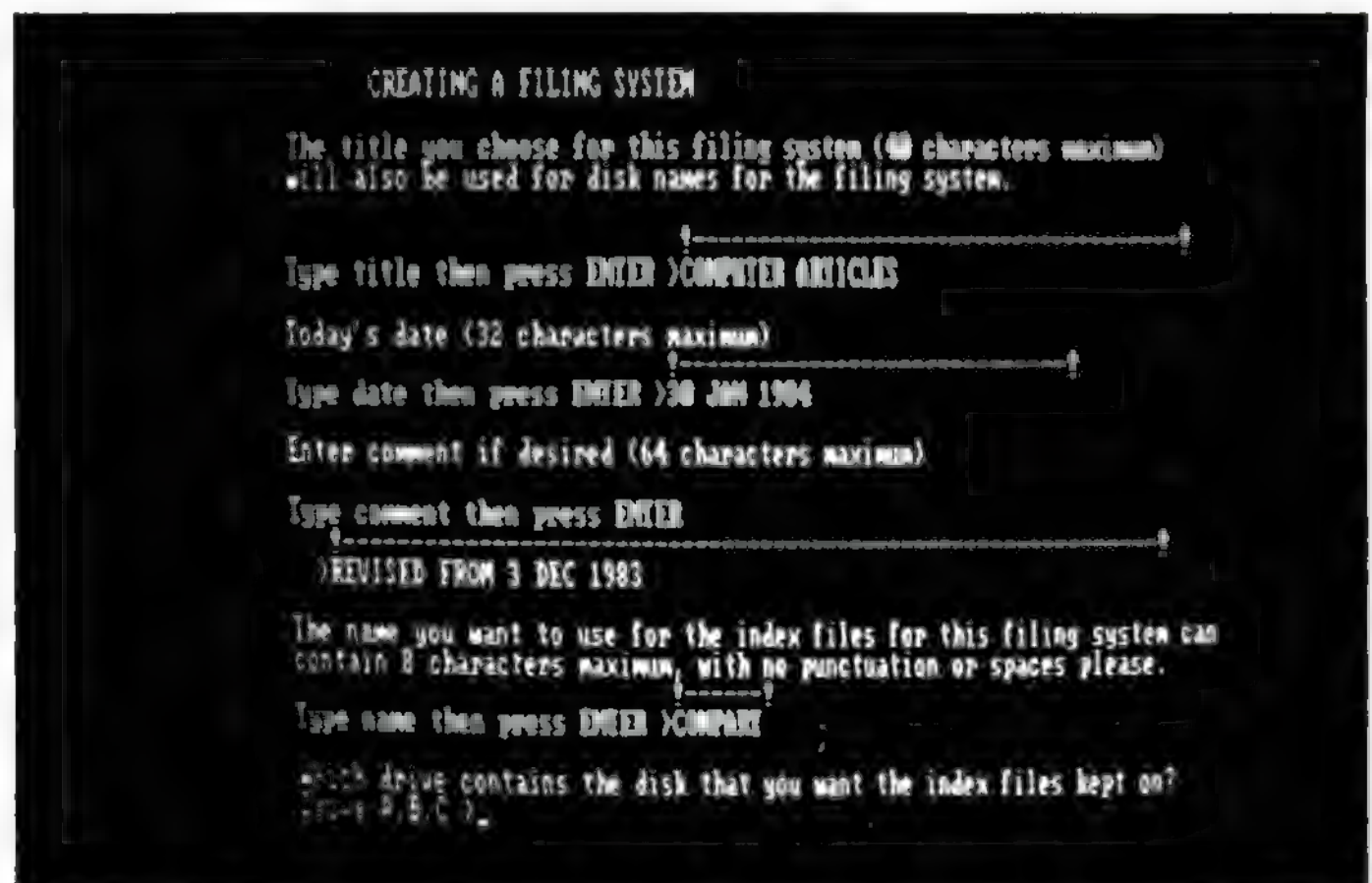
system, and final indexing took 3 minutes, 3 seconds. Using this file system again, but this time with an omit list of 57 words, the time was shaved down to 2 minutes, 55 seconds, and doing the indexing over again on a RAMdisk reduced the time needed by another 34 percent.

The length of time *FYI 3000* needs to create a new system can be a strain on the user, and if the files are modified at a later time with a word processor, the whole filing system must be reindexed. New files can be chained to a *FYI 3000* text filing system, however, and appropriate additions will be made automatically to the main index file without reindexing the entire system of chained files.

Search and Seizure

Searching a filing system with *FYI 3000* is as complicated as creating one, but it is finely choreographed through nested menus. A special main access menu displays the same summary of information on the file system that is given after file system creation or reindexing, and allows you to either search the system, display vocabulary, add entries, reindex the system, or exit from the program. Entries may be retrieved on the basis of a single key word or according to combinations of up to 128 key words linked by the logical operators "and", "or", and "not". Key words linked by "and" will retrieve entries indexed by all of the "and"-linked key words. Key words linked by "or" will find entries with at least one of any of those "or"-linked key words. The "not" operator can be used to retrieve entries that include some key words but not others, such as "key word a" and "key word b" but not "key word c."

If you ask for a search on the basis of a key word that does not exist in the *FYI 3000* vocabulary, vocabulary words that are similar in spelling will be displayed on the screen. Also, entry searches are very fast. *FYI 3000* required less than 5 seconds to search for entries on the basis of one key word. Search results may be output in various ways. Retrieved entries can be dis-



Creating a filing system with *FYI 3000* is done through a series of menus and prompts.

played on the screen with an option to print or save to disk file, either one by one or continuously, or they can be output to a printer, with one or several entries per page. You can choose to output the whole entry, including markers and key words, just the entry text, or just the first portion of the entry between the *C marker and an optional * marker (inserted in the text with your word processor). Scrolling of output to the screen may be stopped by pressing Q or by pressing the Ctrl and NumLock keys simultaneously; the Ctrl-ScrollLock combination completely hangs up the program, which requires a cold boot to restart. This is the only manner in which I was able to crash *FYI 3000*, and no permanent damage was done to the files.

A menu option for examining the key word vocabulary files provides a powerful tool for checking the contents of text files or developing a good key word search. You can output the full vocabulary, an alphabetical range of words, or words containing a specified sequence of characters. These word lists may be output to screen, printer, or disk file, with or without indication of the number of times each word appears in the text. Screen or printer output is easily halted with quit commands.

The Add Entries option is much the

same as the procedure for creating a text system and is quickly and easily accomplished. New disk files are added to the *FYI 3000* filing system by chaining them and adding indexing information to the already developed index files.

Price or Performance?

In sum, both *PCFile* and *FYI 3000* provide text management functions not available on most word processors. They are, however, not concurrent with word processing, and switching back and forth between text management program and word processor is tedious unless a macro processor is employed.

PCFile works only with a separate key word set for each entry, allows word processor input of only one entry per disk file, and only uses pure ASCII entries, but it allows you to enter text with a built-in word processor and is inexpensive. *FYI 3000* is capable of many more functions and applications than *PCFile*. It is more forgiving in use and can deal with many entries per word processor disk file, but it is more costly, and a separate word processing program is mandatory. For the PC user who needs a filing system for text files, either of these programs will prove to be a powerful tool. ■

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Chip Criminals: A Cautionary Tale

This sad story about the victim of an FBI "Chipscam" shows how the 8088 shortage has created a new market for ill-gotten goods, and that computer crime does not always pay.

The following appeared in the *New York Times*:

SUNNYVALE, CALIF., March 9—A U-Haul van pulled into the alley between a Rolls-Royce dealership and a Bank of America branch in Beverly Hills. In the cab were two men and in the back were 1,038,000 silicon semi-conductor chips worth \$1 million at retail.

The men were joined . . . by the 37-year-old owner of (a company) in Beverly Hills. He had been told the chips had been stolen from the maker, Signetics Corporation of Sunnyvale, and he could have the lot for \$300,000.

(The owner) did not know that the conversation was being secretly tape-recorded or that the incident was part of an effort by electronics manufacturers to halt the growing illicit traffic in their product. . . .

Corporate security agents say dealers have started hanging around plant entrances and local lunch counters, trying to seduce workers into diverting products.

Joe shuddered, as he knew he would, when the great steel gate slammed into its receptacle in the wall. That was where the name "slammer" came from, he realized. And then he looked around at the huge, cold cage that was to be his home for the next 12 to 20 years. There were four tiers

of cells facing inward onto a small central courtyard; it looked like some demented architect's conception of an opera circle.

Each cell had a tiny window set way up high in the wall, but little sun could filter



Corey Sandler

through what must have been 60 years of caked dirt. What illumination there was came from the single bare bulb set into a socket behind a set of bars at the top of the cell. And, Joe realized it would probably be best not to inquire into the nature or source of the dreadful smells wafted about in the damp air.

Just yesterday he had still been the CEO, inhabiting a corner office that had two floor-to-ceiling window walls. His name was chiseled in bronze on the door plate. The office had a couch and a bar,

and the company-leased strictly business Porsche was parked outside—the sweet smell of success.

Today Joe was prisoner 19348088, the number stenciled sloppily on a plate hanging askew outside his cell. Mr. 19348088: Put that on the door to the executive office; sign that on the back of the tab at the businessman's lunch at The Four Seasons; give that to the Harvard Business School alumni news.

How the Chips Fell

"Ruggguhmmmm." It was a sound like that of some prehistoric beast. He realized that he had not looked left or right since entering the cell. Another man was in the cell with him, staring, a large, hairless man, his bare chest covered with crude tattoos. He looked vaguely familiar—a face from the crime news.

Joe felt two more sets of eyes boring into his back and turned to see the denizens of the cell directly across from his. These Joe was sure he knew—they had been on the television news for weeks, the objects of a nationwide hunt for the kidnapers of a fast-food heiress.

"Whatcha in for?" his roommate asked with a grunt.

Joe stumbled, trying to find his voice. "Uh, uh, chips," he said, too softly to be heard over the jailhouse racket.

"Say what?"

SANDLER'S SCREEN

"Uh, uh, theft. Grand theft," he said, more loudly this time.

"Of what?," his roommate asked, his eyes alight with interest. "Drugs? Jewelry? Cash?"

"No, nothing like that," Joe said, almost apologetically. "It was chips."

"Cripes. And I thought I'd heard it all. Last week I met some guy who was sent up for ripping off a truckload of designer jeans. Blue jeans! They sent you to this hellhole for stealing potato chips?"

"No, no no. These are microprocessor chips for microcomputers. They're called 8088s, and they're kind of hard to find, and they're really needed for IBM compatibles and clones," Joe said. "These chips are all patented, and even if you manage to design a clone, you've still got to have one of them in order to make the software run. I mean, the whole PC-DOS and MS-DOS operating system is built around these chips, you see. Every one of those machines just *has* to have one, and there's only one legitimate source."

Joe could see that his roommate's eyes were beginning to glaze over, and he began to worry for his own health. "I know it's hard to believe," he began again, "but these little pieces of plastic and silicon—that's sand—go for a couple of dollars apiece and I could fit half a million in a suitcase."

Joe's roommate had woken up. "A million bucks worth of plastic and sand in a suitcase?"

"We dealers call them jelly beans," Joe said. His roommate ushered him into the one chair in the cell, the place of honor in the jailhouse schoolroom. They talked half the night. Joe regaled the whole cell block with the amazing story of how these little microchips had become worth their volume in gold. He told them about something called the "gray market" where legal brokers and parts dealers purchase chips in times of surplus and resell them in times of shortage; about shady characters who made no-questions-asked deals for chips in plain brown boxes; about the outright thieves who would steal on order

from the factories or distributors and make midnight jelly bean deliveries.

The whole crowd really perked up, though, when Joe told them about some dealers who troll for sources by hanging around plant entrances and local lunch counters. "I once made a haul at the Szechuan Gardens in Sunnyvale," Joe said, "but I had to buy three rounds of Frog Legs with Ginkgo Nuts before anyone would even listen to me."

Joe taught the jailhouse graduate students about the true bottom crawlers who made the rounds of scrap heaps and junk piles outside of the microprocessor factories, occasionally making off with a haul of invisibly defective chips. That business was considered bad form, he said, the sort of activity that could bring discredit to the entire gray market. A couple of years ago a whole series of kidney dialysis machines began to fail, Joe explained, and the problem was traced to defective chips that had been diverted from a company that had been contracted to destroy them.

The Set-up

"So how'd you get caught?" his roommate asked Joe.

Joe looked down at his hands, and shook his head as he recalled the shame of his capture. "They set me up," he said. "I'd been doing reasonably well for a year or so, legally reselling chips from a few plants that had some excesses. I even had this deal with this warped 11-year-old genius down in Dallas who had somehow seen all of this coming. He had made a purchase of a couple of hundred thousand of the chips and was storing them under his bed, next to his collection of *Spiderman* comics. But when that load ran out, the kid moved on to anchovy futures, and I was nearly out of business.

"My next big deal was with this executive of a microcomputer company that was in really bad condition. The banks were about to call in their loans, the venture capital guys were going to send in the thugs—I'm sorry guys, nothing personal. Anyhow, this guy calls me up and says

he's willing to unload a crate of 8088s for \$2 apiece. He figures the \$100,000 he'll get will buy him a 30-second ad on the *"Saturday Baseball Game of the Week,"* and he'll be able to sell a few thousand computers and get out of the hole. That is, if he can find enough chips.

"So that deal went down all right, and I began to get a nice reputation as the guy to see. But the next thing that happened was I was approached by this guy who told me he had a spare 25,000 8088 chips for \$2.10 apiece, and was I interested? Sure, I told him, and arranged for the pickup.

"Then these three guys in white shirts and matching rep ties drop by the office and tell me they've got this deal with this company in Taiwan to produce IBM clones—they can bring them onshore for about \$397.50—but they're missing 25,000 8088 chips to make them run.

"Have I got a deal for you, I told them. We no sooner shake hands on a price—\$3.75 each—then these guys come piling out of a panel truck with video cameras and waving FBI shields."

There was silence in the cell block as homage was paid to the poor hoodwinked hood. Then the sound of fitful tossings and turnings took over for the night.

Kid's Stuff

It was just after daybreak when the gate at the end of the corridor slid open again. In marched a new inmate—he was really just a kid, blinking in fear as he took his first steps into the cell block. The regulars stared at the newcomer.

The youngster and his guards paused for a few seconds in front of Joe's cage, and Joe found himself calling out, "What are you in for, kid?"

The boy turned to face Joe. He cleared his throat, and then said, "Grand theft."

Joe pressed him. "Drugs? Jewelry? Cash? Chips?"

The boy shook his head. "I broke the copy protection on Lotus' 1-2-3 and gave a copy to my next door neighbor. His nephew, who just joined the Boy Scouts, turned us in."

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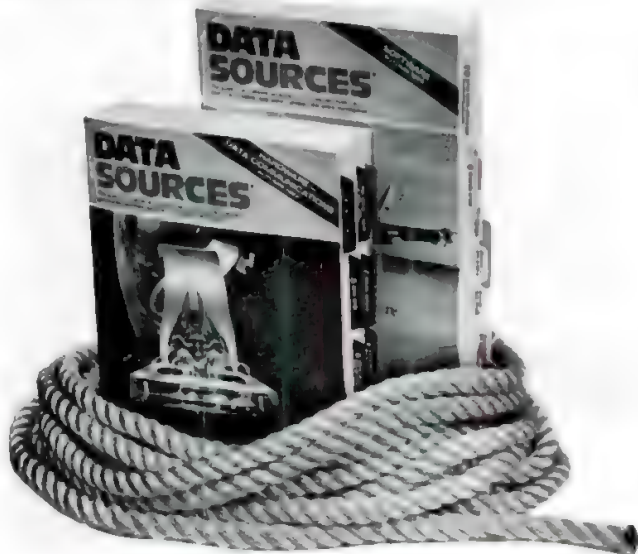
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Chess

Parker Brothers, Inc.
50 Dunham Rd.
Beverly, MA 01915
(617) 927-7600

List Price: \$49.50

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The first thing to appear on *Chess*' display is an information screen where you can set such game parameters as skill level and amount of time per move, or set up specific chess positions for analysis. The information screen also shows one of the six menus of options and indicates which function keys control which options on that menu. The default game settings matched my level of play, so that I just hit the Ctrl-A key combination to bring the

chessboard to the screen.

According to the manual, the program's memory contains 16,000 moves, covering most standard chess openings and their variations, and I decided to test that with my first game. I brought along my copy of *How To Win In The Chess Openings*, just in case. The machine, playing black, responded to my initial three or four moves of a Reti opening according to the book and made each of its



A screen from *Chess* showing a game started in mid-play.

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PC ARCADE

moves within 10 seconds. But then it deviated from the standard opening and began to attack my pawns. Following the book's advice I pressed on to an advantageous position from which I had no trouble winning by the 30th move.

Feeling good at having trounced the machine, I decided to try to repeat my victory without using the book. However, this time I deviated from the standard opening to pursue what looked like a good line of play. To make a long and embarrassing story short, the program found a way to pin and capture my queen, and from there it ground me into sausage. I began to develop some respect for my opponent.

The program runs a chess clock, keeping track of the total elapsed thinking time for each side. In the Normal play mode, the machine is limited to a maximum 240 seconds per move. The program will take the full 240 seconds in a complicated position, but more than make up for that by making many 10-second moves. If the program is taking too much time, you can use one of the function keys to make it play immediately.

There is a Blitz mode in which both you and the machine must respond very quickly. On the other hand, the Tournament mode requires each player to make just 30 moves an hour. There is also a Problem mode that lets you set up any legal chess position. This is useful for practicing the weak points of your play.

The manual contains 100 pages, the majority being devoted to a general discussion of chess, with an excellent section on learning to play from scratch. The manual could benefit from better organization and editing. My biggest complaint is that you are never told how to move from one menu to another.

The program will play either black, white, or both sides, and you can switch sides as often as you like during a game. Used in conjunction with the TAKE-BACK command, you can learn what the machine would have done in your place. Any complete game or position can be

stored on disk and recalled for future play.

Serious chess enthusiasts or tournament players are not likely to be satisfied with this package, as it does not play with the strength of programs such as *Sargon 3.0*. But expert and neophyte alike will appreciate its clean graphics, whether viewed in color or black and white.

On PC's scale of one to six, *Chess* rates:

FUN:	5.0
CHALLENGE:	4.0
GRAPHICS/SOUND:	4.5
TOTAL SCORE:	13.5

Charles Goren: Learning Bridge Made Easy

CBS Software, Inc.
One Fawcett Pl.
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List Price: \$79.95

Requires: 64K RAM, one disk drive, color monitor and color/graphics adapter or monochrome monitor.

CIRCLE 747 ON READER SERVICE CARD.

When I was a teenager, my parents tried to interest me in bridge, but I resisted with everything I had. Baseball, go-carts, and girls were much more exciting than being teamed with my grandmother, who never hesitated to comment on my careless play. Later, I realized my mistake, and was forced to do a lot of studying before my college roommates (who played well) would let me play with them.

A computerized bridge tutor might have helped. *Charles Goren: Learning Bridge Made Easy* is both an excellent tutorial for the beginner and a fun set of challenging problems for the intermediate player. Bridge is based on an intimidating number of fundamentals, and this self-paced tutorial is the best method I've seen to learn them all.

The package, developed by Charles Goren, perhaps the world's leading authority on bridge, consists of a disk, a wonderfully brief manual on the program,

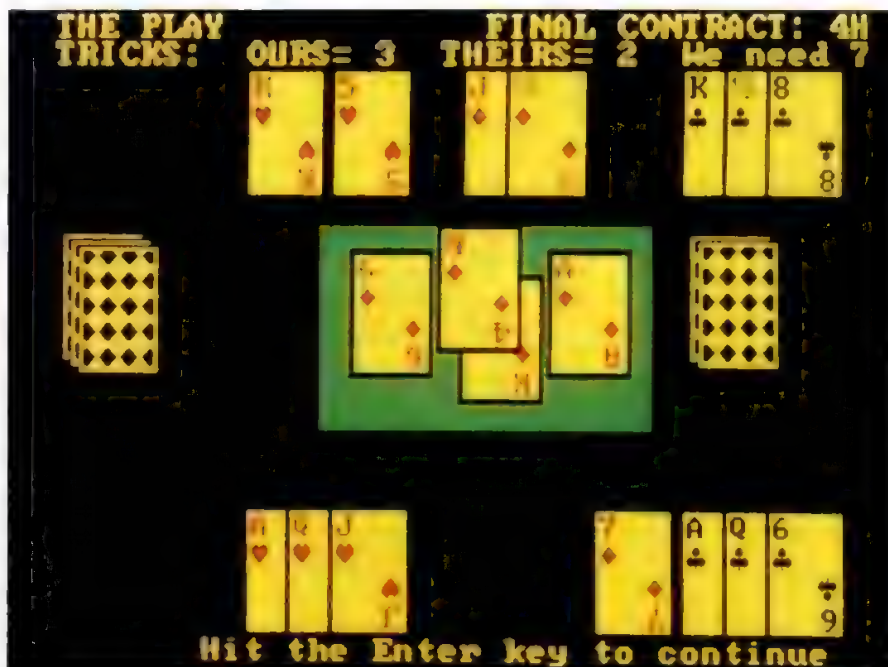
PC ARCADE

and a 140-page player's manual designed to be read in conjunction with the software.

Making a Bid

The program is divided into 11 sections, the first 10 of which are devoted to problems that progressively teach the basics of bridge: hand evaluation, bidding, and rebidding. Each of the first ten sections reinforces some bidding principle by offering an unlimited, randomly generated selection of problems for you to solve. In order to properly bid in bridge, you must be able to evaluate any hand. Every hand is given a numerical value, and this number determines what, if any, bid you should make. Thus, the program's first section deals out hand after hand and asks you to evaluate their worth.

The other nine bidding quizzes assume you can now evaluate the hands dealt out,



A screen from Charles Goren: Learning Bridge Made Easy, showing a diamond trick.

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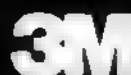
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and you are asked to make a bid, pass, or double an opponent's bid. These sections cover every type of bidding situation from opening one-bids through responder's re-bids, and they are organized according to difficulty and importance. To know bridge well is to know the bidding rule for whatever kind of hand you are dealt, and that takes a lot of practice.

Because the novice frequently needs advice, the designers included a help feature. By typing a question mark, you temporarily replace the problem screen with a help screen that outlines all the rules and guidelines pertaining to the hand you are trying to evaluate. Pressing the Enter key returns you to the problem.

In all ten quiz sections, the computer will keep asking if you want another problem from the current section until you type N. Before you quit a section, the computer gives you your percentage of correct answers for that section before transferring you back to the main menu.

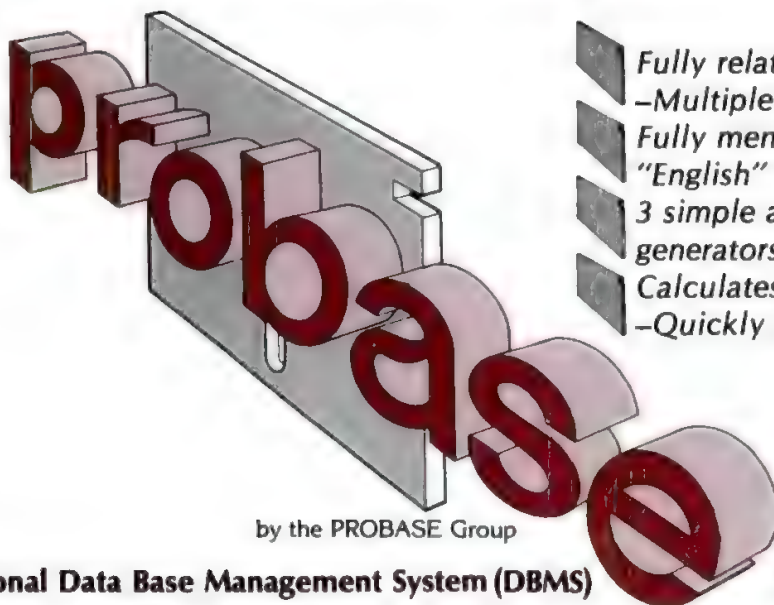
Section 11 contains 100 preset hands that you bid and play as South. These hands are not randomly generated because the designers wanted to impart specific techniques of play in a logical order. On screen, one sees only the South hand during bidding, but all three computerized players' bids are displayed in standard bridge notation. The program responds to each of your plays with a message to inform you if your play was wrong, or even just not the best possible choice. The first 75 hands concern offensive play; the last 25 put you on defense. All 100 hands are illustrated and described in detail in the back of the player's manual.

Personally, I'm glad to own this program because it is patient, user-friendly, and always willing to deal a few hands: a perfect blend of recreation and skill development. On PC's scale of one to six, *Charles Goren: Learning Bridge Made Easy* rates:

FUN:	3.5
CHALLENGE:	5.0
GRAPHICS/SOUND:	3.5
TOTAL SCORE:	12.0

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A Sampling of Books: Four for Business

The IBM PC has turned out to be more of a business computer than a personal one. Here's a look at four books that provide helpful programs and advice for the business user.

If variety is the spice of life, then *Business Problem Solving with the IBM PC & XT* is probably one of the spiciest books available at your computer store. The book includes BASIC program listings, Pascal program listings, some fundamentals of both languages, and even a discussion of the hardware requirements for setting up a business system. All of the programs are business-oriented, but in a more general sense than those listed in *IBM Programs for Business*, which we will look at later.

Wortman states in the introduction that the intent of the book is to make "hard work" into "easier work." As you read through the list of programs it contains, you will surely find several ways that this goal will be realized.

The first chapter takes a look at the hardware and software selections that were made by the author when he set out to write the book. The selections that Wortman made, not coincidentally, also comprise a pretty decent business system. The next two chapters discuss computer languages in general, including a brief discussion of compiled versus interpreted



languages. Wortman describes his reasons for choosing BASIC and Pascal for writing the programs in the book and then gives a brief series of short programs written in each language to demonstrate programming techniques.

The next 29 chapters are devoted to the description of the programs (one per chapter). Some of the program listings are in BASIC, some are in IBM Pascal, and some are listed in both languages. The reasoning behind using Pascal in some listings is "to acquaint you with the virtues of the higher level languages" and because some languages are better at some tasks than others. The actual breakdown is one

program in Pascal only (a program called CNTWORDS that counts the words in a text file), 11 programs in BASIC only, and 17 programs in both BASIC and Pascal. This use of two languages for the program listings is an interesting idea that allows the reader to compare the listings and develop an idea of how the two languages differ in their approach to a problem. It gives the user who knows one of the languages the opportunity to learn the other by assimilation.

Each program is described in detail at the beginning of its chapter. The reason for its inclusion in the book is discussed, and interactive displays and a printout of results are shown. The listings are in bold type for the BASIC listings and a different typeface still for the Pascal listings. Both listings are clear and easy to read. The line numbers in the BASIC listings are in increments of 10 for ease of entry using the AUTO command.

The final three chapters briefly discuss commercial word processing programs and spreadsheet programs and then give some advice for shopping for commercial programs. The programs mentioned are the ones the author has used himself, but he does not attempt to influence the reader to purchase them. He merely states their value as it has applied to his own needs and urges the reader to make a choice based on his or her own unique require-

Business Problem Solving with the IBM PC & XT

Leon A. Wortman, D.B.A.

(Robert J. Brady Co., Bowie, MD)

324 pages; softcover; \$19.95.

BOOK REVIEW

ments. Wortman provides some very worthwhile advice here (based on his own experiences) for anyone who is about to purchase some software.

This book is clearly and concisely written and is easy to understand. Likewise, the programs are clearly presented and of such a variety that most PC users will find

several of them useful. If you are interested in a book of business program listings, this one certainly deserves a careful examination.

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Real Managers Use Personal Computers!

Dick Heiser

(Que Corporation, Indianapolis, IN)
209 pages; softcover; \$14.95.

The title of this book may be only a catchy phrase now, but by the end of this decade it will probably be a fact of life for a majority of managers. Dick Heiser has assembled a good case to prove the worth of the personal computer to today's managers.

The book begins by describing several uses that a manager may have for a personal computer, from calculating, filing, and communicating to word processing and scheduling. Heiser compares the use of a personal computer to the other methods a manager has of accomplishing these same tasks, such as the corporate data processing department or the secretarial pool. He examines the costs (both obvious and hidden) of owning and using a PC. And the time it will take. And the risks involved. And even whether to buy one now or wait until next month.

An entire chapter is devoted to each type of application, such as spreadsheets and scheduling. Several programs that perform each application are mentioned, and some of their highlights are discussed. Each of these chapters ends with a summary and a few words to reemphasize why you really need a personal computer. Heiser spent some time as the owner of a computer store and hasn't yet gotten out of his "sell mode."

The book concludes with 50-plus pages that describe what to shop for in a personal computer. Each piece of peripheral hardware is described. Several systems are named and briefly discussed. No hardware recommendations are made, but the author mentions that he owns and uses an IBM PC and is pleased with it.

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The HX-12 has the highest resolution (690x240) and the finest dot pitch (.31mm) in its class. And yet its suggested retail price is comparable to many medium resolution monitors. The HX-12 brings no-compromise color to the PC and now, with the PGS RGB-80 board, to the Apple IIe as well. **Suggested retail price: \$695.**

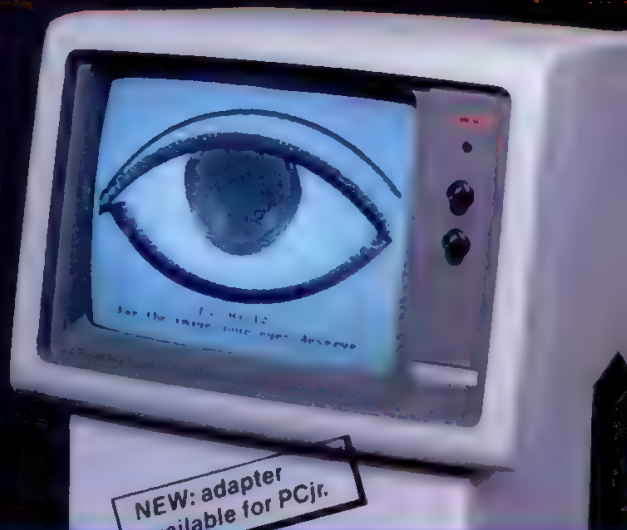
The new SR-12, in conjunction with the PGS high performance color graphics card, also features a .31mm dot pitch supporting 690 horizontal resolution. However, by increasing the horizontal scan rate to 27.5 KHz, the SR-12 can support 400 vertical resolution in non-interlaced mode. This results in a very high quality, flickerless image with the ability to generate graphics and text that is truly of monochrome quality. **Suggested retail price: \$799.**

The new MAX-12 offers you easy-on-the-eyes amber with 720x350 resolution at a suggested retail price (\$249) that is actually lower than the leading green-on-black competitor. And the MAX-12 runs off the IBM PC monochrome card—no special card is required.

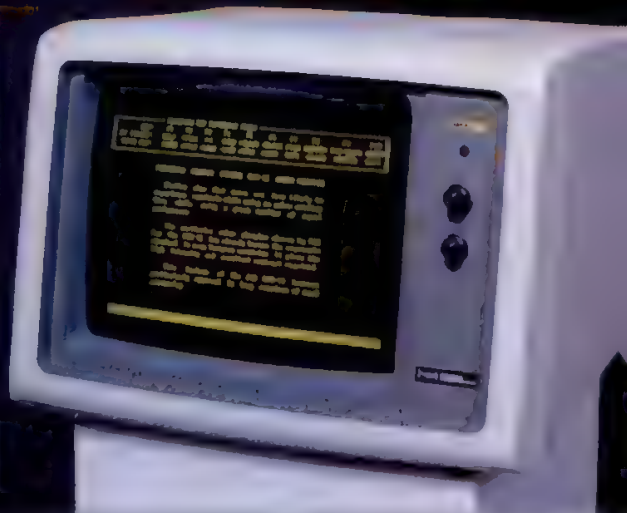
Clarity of the Max 12 is enhanced by dynamic focusing circuitry which ensures sharpness not only in the center but also in the edges and corners. **Suggested retail price: \$249.**

Whatever your needs, from word processing to super resolution graphics, there's now a no-compromise PGS monitor that sets the standard. Ask your dealer for a demonstration and let your eyes decide. Or call for more information and the name of your nearest dealer.

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BOOK REVIEW

If you are a manager (even of your own business) and wonder whether or not a personal computer could help you, read this book. If you aren't a manager but want a personal computer and can't find any way to justify buying one, you can probably find several good excuses in this book.

A Guide to the Best Business Software for the IBM PC

Richard C. Dorf

(Addison-Wesley, Reading, MA)
205 pages; softcover; \$12.95

The author states in the preface that "This book is intended for the person who plans to purchase a computer for use in a small business or in a professional office, such as a law office." The book consists of a combination of chapters that attempt to introduce the newcomer to data processing, computers, software, DOS, and BASIC, plus chapters that review various programs for the PC.

The first four chapters (50 pages) are devoted to providing an introduction to data processing and microcomputers. The author starts with the "input-processing-output" description of computers and progresses onward through hardware to DOS and BASIC. The chapter entitled "IBM Personal Computer Software" is a 5½-page synopsis of PC-DOS 1.0.

Chapter 4, "The BASIC Language," covers 20 pages and begins by describing the four basic stages through which the solution of a mathematical problem proceeds: precise formulation; development of a mathematical model; mathematical analysis; and computation of a solution. From this humble beginning, Dorf proceeds into flowcharting, programming in general, and then "Using BASIC." In the detailed instructions for BASIC, four programs are used as examples, and three of these four have errors that prevent them from producing the output shown.

The remaining 14 chapters consist of reviews of a variety of programs organized by function, such as word processors or

spreadsheets. Most program reviews contain a summary of the program and a paragraph or two of comments about the program's features. Most are rated on ease of use, documentation, reliability, and cost-effectiveness. Each of these categories is given an evaluation of fair, good, very good, or excellent.

The main fault that I found with Dorf's evaluations was the lack of a "poor" category. Of the 80-plus programs that are evaluated, surely some of them must be poor in *some* area. Overall, the programs are rated quite highly, with very few even getting the lowest possible rating of "fair."

This book is filled with good intentions that are not realized because the author presents complex topics in a manner that is much too condensed for a beginner and performs his reviews in much less depth than an experienced user would expect. This guide would be a much better value if both the instructional material and the software reviews concentrated more on quality than quantity. Overall, it has little to recommend it.

IBM Programs for Business

Charles D. Sternberg

(Hayden Book Company, Hasbrouck Heights, NJ)

270 pages; softcover; \$15.95

This collection of over 60 BASIC program listings gives descriptions, flowcharts, and detailed descriptions of both program variables and data files. It consists of three sections: "Financial Control and Analysis," "Inventory Control and Analysis," and "Production Planning and Control." The first two contain groups of related programs that address particular business problems. The third section, as well as one chapter in each of the first two sections, consists of standalone programs that relate to the section topic.

In the "Financial Control and Analysis" section, Sternberg has included "A Simple Bookkeeping System" that consists of 10 BASIC programs. These pro-

grams create account files, post journal transactions, provide three different end-of-month reports, and perform both income and expense analysis. Several are utility-type programs that operate on the files used by the bookkeeping system.

**This book delivers
on its promise,
and it makes its
delivery with style.**

Also in this section there is an accounts receivable system consisting of two programs and a chapter of general financial programs.

The highlights of the "Inventory Control and Analysis" section include a perpetual inventory system consisting of two programs and a periodic inventory system that uses 14 programs. There is also a short collection of general inventory programs that includes a "Reorder Point Computation" program that, when given daily use and number of days from ordering to receipt of an item, calculates the point in your inventory when a reorder is necessary. Also included is a material locator program that will return the warehouse location of any inventory item.

The third section, "Production Planning and Control," consists of 10 general programs that are related to the title. Some of the programs are "Job Costing," "Bills of Materials," "Job Routing," and "Production Cost Comparison."

All the programs included in this book are reasonably well-documented and include examples of their output. The program listings are easy to read and appear to be computer-printed rather than typeset, thereby reducing the chance of typographical errors. The book delivers on its promise to provide programs for business, and it makes its delivery with style. The programs are not for the home user, but if you need some well-written BASIC programs to help you run a business, give *IBM Programs for Business* a look. ■

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A Writer Takes Care of Business

A word processing program can help you manage your free-lance business if you set up a file of simple reminders to keep track of deadlines, story ideas, and payments.

Many people debate over whether writing is an art or a craft, but one thing's for sure: Free-lance writing is a business. The business aspect may be less satisfying than the interviewing, researching, and writing, but it's essential to getting bylines in print for pay. To maximize the time available for writing, you should minimize the time you must spend on the business aspects: scheduling, deadlines, billing, merchandising, taxes, expenses, travel arrangements, bad debts, and contracts.

While specialized software and on-line telecommunications services can help with some of those elements, word processing software can also do its share to help with the business side of free-lance writing.

I survived, somehow, in the old days when a typewriter rather than a PC or word processor was a free-lancer's faithful companion. Now my typewriter rests in its case, out of sight behind the desk. If you've made that transition already, you probably believe you're writing faster, with fewer frustrations and more polish. And if that's true, you're probably producing and selling more articles (or whatever it is you write) than before.

That's not all. Once you begin using a PC to help you write, you should take the next step: using it to keep track of deadlines and commitments, story ideas, what



you've written, and, most importantly, your income.

On the Track

Many free-lance writers hold full-time jobs, often as reporters or editors, public relations specialists, researchers, consultants, or teachers. This means handling regular on-the-job duties while juggling a variety of other assignments. The ability to write well, spell words correctly, and submit a neat manuscript isn't enough. When you're working on a number of projects for different editors under time constraints, one of the greatest challenges is to meet deadlines.

There are several ways your computer

can accommodate your scheduling needs. The first step is to find the most efficient way to use your PC to keep track of those deadlines.

One solution to this problem would be to purchase scheduling software, which is an electronic version of an appointment book. But this is not absolutely necessary; you can use the program you already own and feel comfortable with. You can create a file to handle scheduling with the same word processing software you use for writing your magazine pieces or novels.

With my *MultiMate* word processing program, I set up a file called **FREE-LANCE** to do just that (see Figure 1). The first entry is a "Deadlines" category. Under that title, I list each magazine or newspaper for which I have an outstanding assignment, together with the topic and the due date. The current date appears at the top of the screen as a reminder of when I last added or altered an item.

You may feel comfortable with the same type of arrangement, listing assignments by publication. Or you may prefer setting up your list chronologically, with the closest deadline heading the roster.

Either way, it's more convenient than marking deadlines on your wall calendar. With this type of system, checking on deadlines is a matter of entering only a few keystrokes each time you load your word processing program into your PC.

WRITING

A "Deadlines" category encourages self-discipline by helping you pace yourself. In addition, it can help you avoid embarrassment. When you're overex-

tended, the schedule can give some advance warning so you can request an extension of a deadline without messing up the editor's schedule.



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This is only a beginning. You can also use the **FREELANCE** file to set up categories to monitor the status of pending inquiries and submissions. Under each, list the publication, a one- or two-word description of the subject of your query or article, and the mailing date.

Another likely category is "Awaiting Payment." Here you can list the publication, topic, mailing date and, if you know what you'll be paid, the amount due.

Using your word processing program to maintain this type of tracking system makes it convenient to check on the status of articles, inquiries, and payments. With

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AS OF JULY 7, 1984

DEADLINES
PENDING SUBMISSIONS
PENDING INQUIRIES
AWAITING PAYMENT
INQUIRY IDEAS - UNSENT
WRITTEN ON COMPUTER

Figure 1: The **FREELANCE** file can be checked or updated every time you boot up your word processing system.

a glance at the monitor or printout, you can tell when it's time for a follow-up letter or phone call to an editor. You can also enter the date of any follow-up contacts next to the original entry.

Idea Reminders

Free-lancers think up or stumble across story ideas more frequently than they write inquiries or articles, so a category called "Inquiry Ideas, Unsent" can be useful.

You should include both a capsule of the idea and at least one potential market. This serves two purposes: It keeps you from forgetting about a possible source of income, and it prompts you to get going with a letter or phone call to an editor.

The **FREELANCE** file setup I have devised takes a logical approach. A possi-

ble story may start in your "Inquiry Ideas—Unsent" section. When the query letter is mailed, move the listing into "Pending Inquiries." If the editor's response is positive, move it to your first category, "Deadlines." If it's accepted, list it under "Awaiting Payment."

What You Earn

Personal computers and word processing software are expensive. To help calculate how your investment is paying off, keep tabs on how many articles you're writing with your PC and how much you're being paid. To do so you can create another category called "Written on Computer." Arranged by publication, it lists the subject and payment for each piece written on your computer. Instead of an aggregate listing, you may prefer breaking down your earnings by time period—month, quarter, or year, for example.

The FREELANCE file approach is flexible. You may want a separate section for nonpaying markets such as poetry magazines or professional journals. Maybe there should be a section for rejected submissions. You might want to separate one-shot sales from the markets you write for frequently as a columnist or stringer. If it suits your purposes, you can break out fiction from nonfiction, books from articles, poetry from prose, or ghost-written speeches from promotional pamphlets. You may need other categories, perhaps to keep track of greeting card submissions or book proposals. Coding entries with an asterisk to indicate simultaneous submissions or reprint solicitations may also be helpful.

Word processing software isn't designed to handle every free-lance business need. You may decide to buy a spreadsheet or accounting program for keeping track of all your writing-related expenses. A modem and telecommunications software package can also prove handy. For example, they can be used to access thousands of electronic databases for research. And if you travel frequently on assignment, the electronic version of the *Official*

Airlines Guide or a similar transportation schedule can make planning easier.

But the word processing program is already an essential part of your writing

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On Line-Libraries

A PC and a modem can put vast libraries of information at lawyers' fingertips. Those who research the law will appreciate this map of the major, commercial, on-line databases.

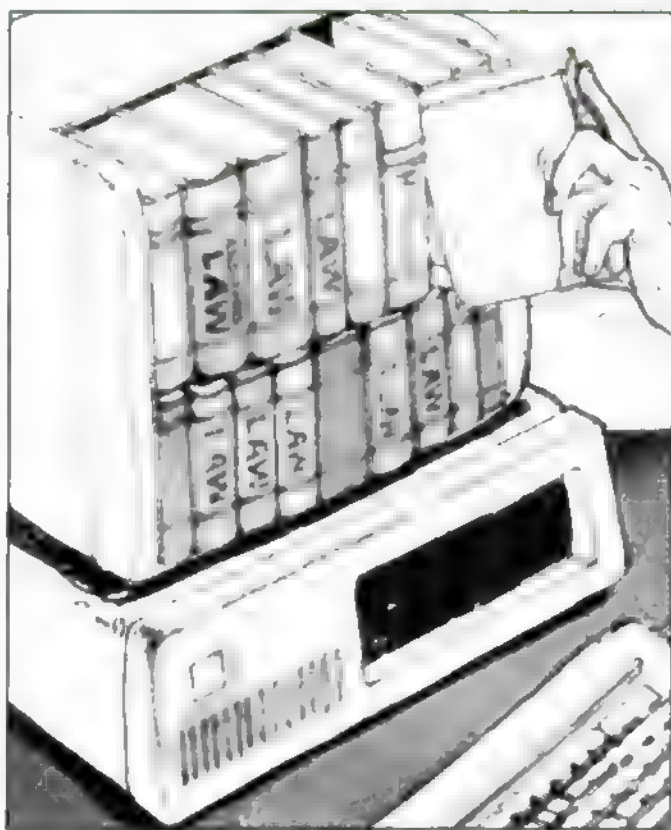
A computer that can recite the law is an authority to which the unsophisticated layman surely would defer. But for lawyers, the computer—even one versed in the legal code—is not a teacher, but merely a tool that is only as authoritative as its database.

Legal databases have been growing and are now being fine-tuned to serve the research needs of lawyers who have access to phone lines and a PC.

Before the on-line database, there was (and still is) the paper database—*U.S. Reports*, *United States Code*, the statutes of the 50 states, and untold numbers of other sources amounting to millions of words of material. The trick is to find the right ones before you run out of time and your client runs out of money.

For centuries, lawyers depended on their own memories or the kindness of indexers to help them in their quest. But for nearly a decade and in increasing numbers, large law firms have subscribed to Mead Data Central's computerized legal database, Lexis, to cope more efficiently with the search for legal precedent.

Lexis reduces the full text of federal statutes and state and federal judicial opinions to a format the size of a personal computer terminal. Lexis offers you the equivalent of the whole book, of which any part can be called up on screen. If you type in a string of words, such as "due process of



law," the computer will find all the cases and statutes that contain it.

Mead Data Central's only serious competition comes from the venerable West Publishing Company of St. Paul, Minnesota, a sleeping giant in the field of law book publishing. West Publishing has belatedly offered a computerized full-text research service. Other competitors operate at the periphery of the market.

Dialog indexes the writings of legal commentators. Offered by Lockheed's Dialog Information Services, Inc., of Palo Alto, California, this information retrieval service contains hundreds of separate databases, several constructed especially for lawyers in such areas as patents and crim-

inal law. Because many of the Dialog databases are bibliographic rather than full text, after you locate a citation, the most you will have without the resources of a library is an abstract or digest of the report, journal article, or book in question.

Last year, the Bureau of National Affairs, with offices in Washington, D.C., and other major cities, offered a full-text electronic version of its well-established print services, the *Daily Tax Report* and the *Daily Securities Report*. Though its labor and patent law services are available through Dialog without subscription, these new products are being marketed directly to subscribers.

The Chicago-based Commerce Clearing House, a leading publisher of loose-leaf materials on such topics as tax, labor, and securities law, decided to approach the computer cautiously. It is still beta testing its Electronic Legislative Search System that will track thousands of proposed laws under consideration in federal and state legislatures.

Prentice-Hall of Englewood Cliffs, New Jersey, has put its loose-leaf federal tax service into an electronic database called PHINet. (For additional sources of interest to law professionals, see "The Case for Computers in the Law Office," *PC*, Volume 2 Number 7.)

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LAW

tion, isn't the proliferation of database services a step backwards? Aren't Lexis and Westlaw just Tweedle Dum and Tweedle Dee? Granted, what they offer appears redundant, but competitive pressure can produce advantages.

For instance, since West Publishing Company challenged Mead Data Central, both companies have expanded their available databases and branched out in different directions. The atmosphere at each firm's headquarters is one of aggressive growth. Moreover, Lexis has just announced a new pricing structure in response to the competition.

In the quest for a greater market share, each firm now permits customers to access its database with a modem and a general-purpose micro, such as the IBM PC. Westlaw took advantage of the state of the microcomputer art early on to let you access Westlaw on your own machine rather than one rented from the service. Lexis met the competition this past fall, dropping its requirement that you rent one of its dedicated terminals for \$55 to \$150 a month as a condition of subscribing.

The Data in the Base

The main overlap of Lexis and Westlaw is in the core data, which for the majority of lawyers counts the most: the full text of all federal statutes, regulations, many administrative decisions, and most significant federal and state court cases.

On both systems, federal taxation is one of the most thoroughly documented areas. Thanks to the Freedom of Information Act, items in the databases range from internal memoranda of technical advice from the Internal Revenue Service national office to its agents in the field right down to the private rulings requested on specific situations with taxpayer names deleted. An advantage of accessing private tax rulings is that you can discover the positions the IRS is taking on sensitive issues without raising your head (or your client's) above the foxhole.

Each service extensively covers the patent field in special libraries, but with

differences that are important to the practitioner. Westlaw contains the federal statute, the regulations, and the court cases in full; Lexis duplicates this, adds some administrative decisions, and, through its new Lexpat, supplies the full text of all patents issued since 1975. Dialog weighs in with six highly specialized databases—patent claims, abstracts, citations, classification codes, and a chemical dictionary. Dialog offers information of varying depth and for different periods of time, with an index containing the case name, an abstract, a subject classification, and bibliographic citations.

Lexis and Westlaw cover the case law of the 50 states in the form of the judicial opinions of the highest state courts and selected lower courts. The statutory law of the states is generally not on-line, although Lexis does offer New York statutes.

Both systems contain *Shepard's Citations*, which traces the history of a decided case to see if it's been overruled or distinguished, but each has its own method—Lexis's Auto-Cite and Westlaw's Insta-Cite—to do the job faster and better.

Westlaw has special libraries on military justice, admiralty, insurance, and Eurolex, while Lexis features British and French law libraries and the full texts of over a dozen treatises on such topics as acquisitions, mergers, bankruptcy, labor law and litigation. Lexis supplements its formal law resources with selected annual reports and proxy statements of publicly traded corporations chosen by the American Institute of Certified Public Accountants and with the pronouncements of the Financial Accounting Standards Board.

Specialty of the House

What most distinguishes Lexis is its recent addition of Nexis. Nexis is a full-text library of over a dozen newspapers (including the *Washington Post*, *New York Times*, *Legal Times*, *Computerworld*, *Japan Economic Journal*, and the *Current Digest of the Soviet Press*), over 30 magazines (the *Economist*, *Forbes*, *Newsweek*, and *Byte*), 10 wire services, and 3

dozen newsletters.

According to Mead Data Central, the Nexis library will give lawyers news of developing legal issues before the lengthy process of enacting a statute or deciding a case is completed.

The most touted features of Westlaw's coverage are its editorial additions: the headnotes, the synopses, and the key numbers, first created to enhance the law books in the West Publishing stable. These summaries use common, less-formal terminology rather than the technical legalese that is found in many statutes and judicial opinions. They can help find a case that is otherwise buried in esoteric

Lexis reduces the full text of federal statutes to a format the size of a personal computer terminal.

legal vocabulary. The key numbers allow a lawyer to retrieve authorities by topic from a numbered list of common legal concepts.

If, instead of cases or statutes, you want an article discussing your problem, Dialog is your best bet. It offers the Legal Resource Index to over 700 law journals, half a dozen legal newspapers, and a gaggle of government legal publications from the Library of Congress. Once you unearth your citation, then it's back to the hard copies, unless the reference happens to be to one of the six law journals for which you can switch to Lexis for full text—those from Harvard, Yale, Columbia, and the Universities of Virginia, Chicago, and Pennsylvania.

This completes the map of the electronic law library that PC users can plug into. A discussion of how best to use the database services for legal research will be the subject of a future law column. ■



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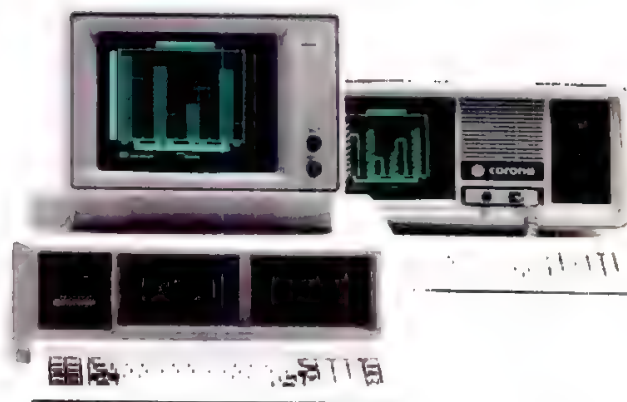
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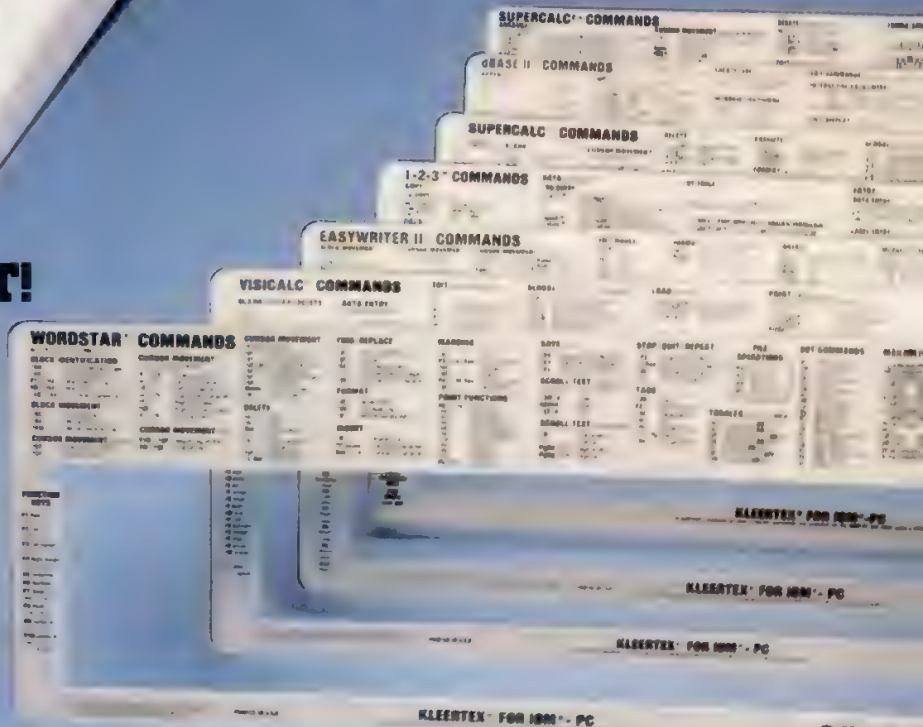
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A Scientific Database: Conquering Infoglut

Researchers can use an IBM PC and an inexpensive software program to organize their scientific literature. This is one way of dealing with what some call the "infoglut."



John Naisbitt, in his best-selling book *Megatrends*, used the word *infoglut* to describe the overwhelming amount of information that is at our disposal today. At present, the volume of scientific literature is doubling every 3 to 4 years, and the doubling period is expected to decrease to 2 years in the easily foreseeable future.

This glut of information is a problem for every researcher. Naisbitt has advanced the point of view that the only way to survive this avalanche of information is to organize it and analyze it. What is pertinent and useful must be placed in some structured and accessible form. What is not useful must be winnowed out. This

kind of organization *is not* represented by the shelves full of professional journals and the files of clippings and articles that, until recently, most of us could rely upon for access to information.

Most of us are not fortunate enough to be associated with large universities or government institutions, which are staffed with battalions of professionally trained reference librarians working in magnificent libraries equipped with terminals, printers, modems, and access to the huge (and costly) on-line databases that have sprung up in response to infoglut.

For those without this enviable support structure, we'll illustrate a professional database structure that has been set up on

an IBM PC using software that costs less than \$50.

Bibliographic Database Design

Designing a database is a bit like writing computer software—if you dive right in, you're going to get into trouble. In writing software, the first step is to design the flowchart so that you have a roadmap defining what it is you're going to do, how you're going to do it, and where that will take you.

The most important thing to do before you establish a database is to think. You should ask yourself: What, specifically, will I use the database for?

How do I want to be able to access the information? By author? By publication date? By topic? All of the above? What is the most logical order in which to enter information into the individual records?

The database software we used for this application is Jim Button's freeware *PC-File III*. For those of you who may not be familiar with this software, we can only say that you have a treat coming. We won't take the space here to describe how it works, because the documentation that accompanies *PC-File III* on the distribution disk is complete and understandable and is an example of outstanding software documentation. At a (voluntary) \$45 per copy it's probably one of the best buys around for IBM PC users. (For a review of

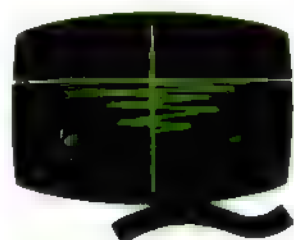
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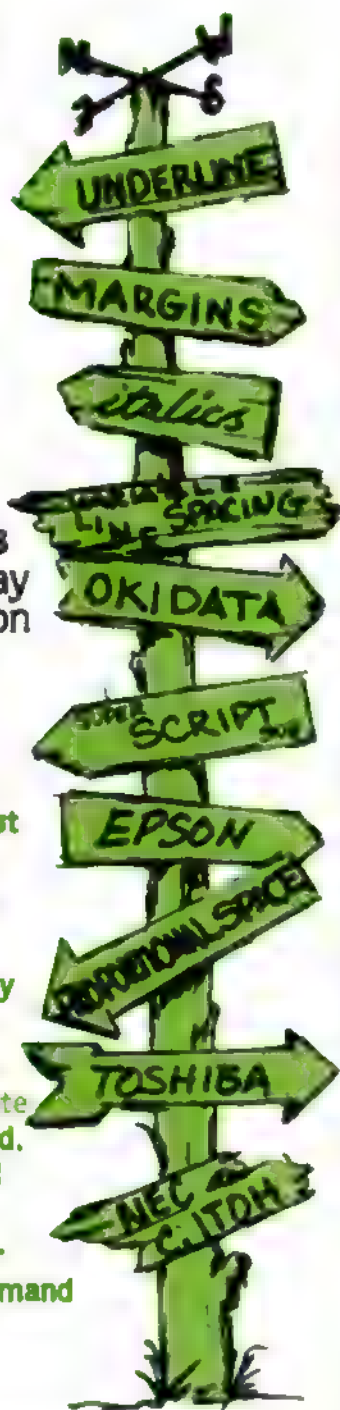


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SCIENCE

PC-File III, see the database survey in this issue.)

A few observations concerning *PC-File III* must be made before the structure of the bibliographic database is outlined. The software limits the length of individual fields in the record and the total number of fields in each record. The limitation in this case is that if your records contain more than 21 fields, you must limit the length of each field to 25 characters. By comparison with other, more expensive database software, this is a limitation of about 1 kilobyte per record. You can plan on storing at least 350 documents on one floppy disk using the database structure described here. We advise that after 350 records have been put on a disk you should check to see how much disk space remains. Nothing catastrophic will happen if the space runs out, but it's annoying to have to go back and rekey a record when paying attention beforehand could have avoided the problem. It's also time-consuming and a potential source of errors.

The structure shown below was used to develop a bibliographic database using information available in hard copy from the Defense Technical Information Center (DTIC) and that referred to foreign documents as well as those written in English. Any call or acquisition number may be substituted for the ADN number if you don't work in that system.

The record layout and number of characters permitted (shown in parentheses) in each field is as follows:

ADN(10)

This is the DTIC acquisition number.

LANG(10)

lists the language of the document.

SOURCE1(25)

SOURCE2(25)

SOURCE3(25)

The source field allows you to enter a complete bibliographic reference: the journal name, volume number, page, and date.

TITLE1(25)

TITLE2(25)

TITLE3(25)

TITLE4(25)

Four 25-character lines will usually be sufficient to enter the document title.

NOTE(25)

This field permits you to enter a comment as to the nature of the reference—"journal article," "personal communication," or the like.

AUTHOR1(25)

AUTHOR2(25)

AUTHOR3(25)

AUTHOR4(25)

AUTHOR5(25)

The author field provides space for the names of up to five authors. Always enter the last name first, followed by first and second initials.

DATE(6)

Enter the date in numeric YYMMDD format. This format allows easy ranging by year of publication.

SERIES(20)

Many large institutions assign series designations to identify publications. If you never refer to such publications, omit this field.

DESCRIPT1(25)

DESCRIPT2(25)

DESCRIPT3(25)

DESCRIPT4(25)

DESCRIPT5(25)

DESCRIPT fields allow you to enter key words (which you can make up yourself or pick out of a list) that allow you to search rapidly for topics or combinations of topics in any order in the entire database.

ABSTRACT1(25)

ABSTRACT2(25)

ABSTRACT3(25)

ABSTRACT4(25)

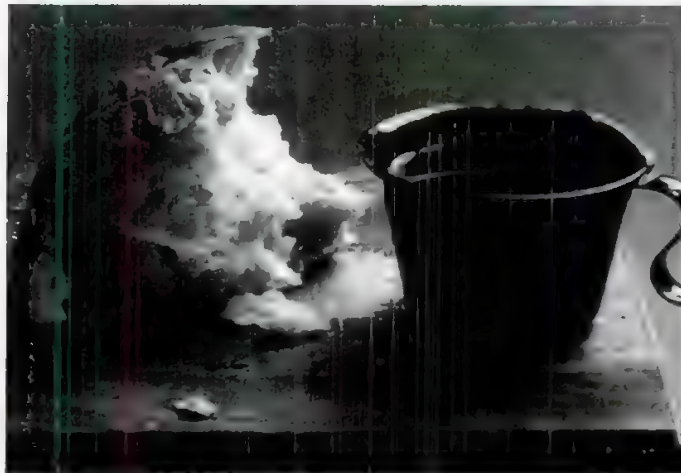
ABSTRACT5(25)

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This and all subsequent ABSTRACT fields allow you to enter a brief abstract of the essential information of use to you that is contained in the reference docu-

ment. We strongly recommend the use of ABSTRACT fields.

LOCAL(25)

This field allows a brief note, or a special symbol, such as an asterisk(*) or number sign(#), that tells you where the hardcopy of a document is available locally.

With a record layout such as this coupled with the power of *PC-File III* you can, in fact, establish a structure that allows you to retrieve data in virtually any fashion. The FIND command can be invoked to retrieve a record based on any of the fields listed above. You can even retrieve on an ABSTRACT field (but not very rapidly) and, of course, you could search on the ADN, LANG, SOURCE, TITLE, AUTHOR, DATE, or any of the DESCRIPT fields.

The most recent releases of the software allow Boolean searches using and/or types of specifications. Furthermore, that kind of search can link up to ten conditional statements. You could, for example, call for a search with `DESCRIPT1 = DRUGS (AND) DESCRIPT2 = PERFORMANCE (OR) REACTION TIME`, and link up to ten such relationships. Obviously a search for papers that were published prior to a given date would simply call for `FIND DATE <760000`, which would find for you all publications in the database written before 1976. The software can help with problems such as an inability to remember exactly how an author spells his name. Suppose you recall reading an interesting paper by Smith, Schmid, or maybe Schmitt. In this case, you call for a `FIND AUTHOR1 >MI`, and the software will find all the authors with those letters appearing together in their names.

A database virtually identical to the one just described has been in use by one of the authors for nearly 2 years and contains over 1,000 references in the Aerospace Life Sciences area. It has become an invaluable asset to research and grows more powerful with each entry. ■

R. E. Van Patten is an aerospace life scientist for the U. S. Air Force. Marjo Maxwell is a reference librarian and a scientific bibliographic database designer.

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Computerizing A Small Practice

Medical applications for microcomputers range from record keeping to diagnosis and treatment. Before you put together your own system, consider this hardware prognosis.

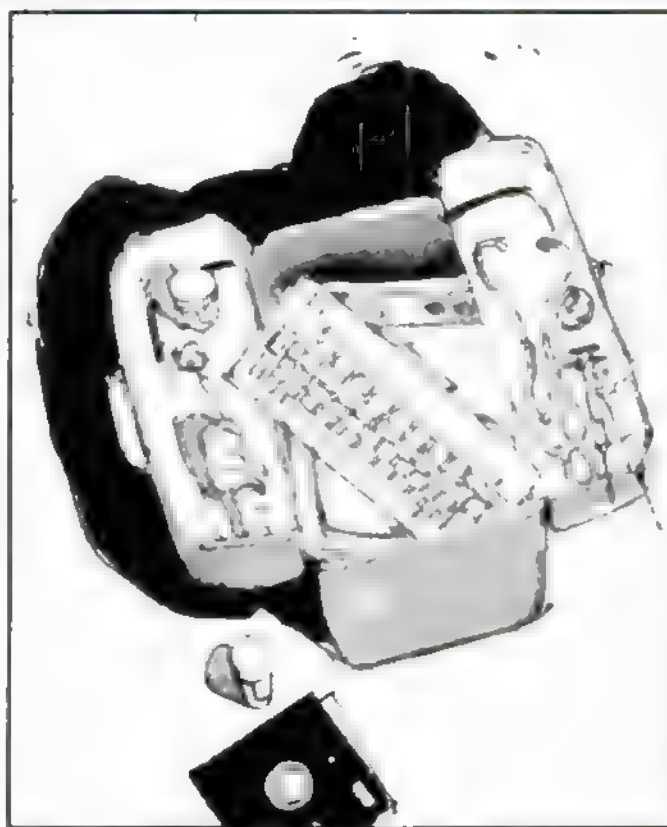
Medicine is a profession in which the manipulation of obscure facts and statistical probabilities can make the difference between cure and death. It is the ultimate pass/fail exam. Computers offer a way to catalog and easily retrieve the mass of data involved and improve the odds of successful treatment.

In the past 10 years, medical professionals have been relying more and more on computers and software—from Computerized Axial Tomographic (CAT) scanners to office management packages. Until recently these advances were limited to large institutions and groups of physicians that had the resources to purchase and operate the equipment and programs required.

With microcomputers, the cost of using many of these services has dropped to a point that allows every physician to use them at home or in the office, and soon—with the newer briefcase-sized portables—on rounds in the hospital.

On-line databases provide up-to-the-minute information on the diagnosis and treatment of poisoning and drug abuse, drug interactions, and so forth. If you're interested in the latest research in a field, it's as easy to access Medline, the National Library of Medicine's on-line database, as it is to make a phone call.

Also available are a variety of programs for use in the office and hospital to help in the routine care of common prob-



lems. Differential diagnosis, individual drug dosing, and history taking can all be speeded up and made more accurate by the use of appropriate software. This is the first in a series that will look at software available for the individual practitioner and small group, that can be run on microcomputers, such as the IBM PC.

Most software now available is addressed to the practitioner who would like a program to handle office billing and accounting. The rapid proliferation of these programs is indicative of the interest that has been created in the marketplace by physicians. Yet because of the number and variety of these programs, choosing one can be very confusing.

Any consultant will tell you to build a

comprehensive application system based on what you want to accomplish, rather than considering the hardware and software separately. That's generally sound advice, but I've chosen to ignore it.

Many of the medical office systems on the market run on minicomputers, but these systems are usually more expensive and less flexible than those that run on the PC. The ability of the PC to work as a terminal, the PC's relatively low cost and the variety of software available for it make it a good hardware risk.

There are many companies that offer all-in-one office management packages consisting of software, a computer, a keyboard, CRT, printer, and storage device. These "turnkey" organizations offer full service following sale. If something doesn't work, it's the supplier's problem, and the supplier promises to cure all ills.

Knowing this, many software suppliers have become VARs (value added retailers), buying hardware directly from manufacturers at wholesale prices and bundling it with software to sell to the end user. Increasingly, these VAR's are using IBM as their wholesale hardware supplier. And those who are not yet using the PC are likely to support its use in the near future because of its great popularity.

Peripherals

No matter how you purchase your system, there are several points about hard-

ware that you should always carefully consider.

Disk space for storage of records is one. I suggest you purchase a hard disk at the start. Ten megabytes should do nicely for most practices. You could start with floppies and convert later, but it probably wouldn't be long before you spend the extra two to four grand for a hard disk.

The speed of a hard-disk system will certainly help in a busy office, but it's not the speed that is most important. If you estimate that about 2K of memory is equal to one typed page, you can easily imagine how, with a floppy disk system, your office might soon begin to overflow with floppies, not to mention the confusion and time lost searching for the right diskette. How many would get lost or ruined?

Backups are also a problem. You need at least one for each floppy, and having

two copies of everything will help you sleep at night. That means perhaps 30 to 60 floppies to upload and download each day. It takes about 2 minutes to do this for

I strongly suggest
you purchase a
hard-disk system at
the start.

each floppy, so after a week you'd probably be ready to unload your system on the next colleague who innocently asked how you were making out with that new computer system.

Luckily a solution is available. First, buy a hard disk. Then be sure you have a streaming tape backup unit for the hard

disk. These units are fast and easy to use, though they too add to the initial cost.

As long as you're thinking hardware, you ought to think about printers as well. That's printers with an *s* on the end because you might want more than one, especially if you're planning to fill out more than one type of form in your office. It can get pretty messy (and it's darn slow) to change the paper in the printer each time you want to bill a different third-party payer or print a bill for your patient and his third-party payer before your patient leaves the office. You should consider buying at least one letter quality printer if you intend to use the system for word processing and correspondence.

Back to Software

There are dozens of off-the-shelf programs designed to help manage a medical

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MEDICINE

office with the use of a microcomputer. For the last 12 months I've been using and reviewing them in my office. I've run through about ten different packages for the PC. Not one has completely fulfilled my desires, though most have performed the tasks they were designed for reasonably well.

Are my expectations unreasonable? I don't think so, nor do the programmers with whom I've spoken. But my hopes did exceed the abilities of some of the programs. And therein lies a key to satisfaction with a medical office management program.

Most physicians want the computer to do their billing and to cut down on the amount of time spent typing forms in the office. If your system is designed to type a bill, it will type a bill. And that's fine if you hand it straight over to your patient in

expectation of immediate payment. But you may need to fill out several different forms for several different third-party payers, and, unless specifically designed to do so, your program won't.

You also have to decide what else you'd like your computer to do. Do you really need it to keep your appointments, or is your calendar good enough? Would you like to keep a detailed record of procedures and charges, or just the outstanding balance for each patient? Do you keep accounts by family or by individual? Are you going to use your office computer to keep chart notes and phone messages, or only for billing? Will you be doing clinical research, say on the response of a subgroup of patients to a given chemotherapy regimen? Do you want the machine to keep track of the time elapsed since the last time you saw a patient and automati-

cally recall them for a visit? Do you want it to keep track of the drugs each patient uses and warn you if two drugs in the list have an adverse interaction? Should it do your office payroll for you? Would you like to access a database from your office?

Programs are available to perform each of these functions (in some cases several of them) quite well. The programs differ widely in cost, not necessarily in relation to the number of functions performed or the quality with which they are executed. In the next column I'll look at some of these functions in more detail and at some commercially available programs so that you can judge for yourself which will do the job best for you. ■

Bernard Friedman is a general practitioner in Ithaca, N.Y., who runs his office with an IBM PC.

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COLOR ADAPTOR

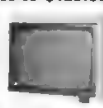
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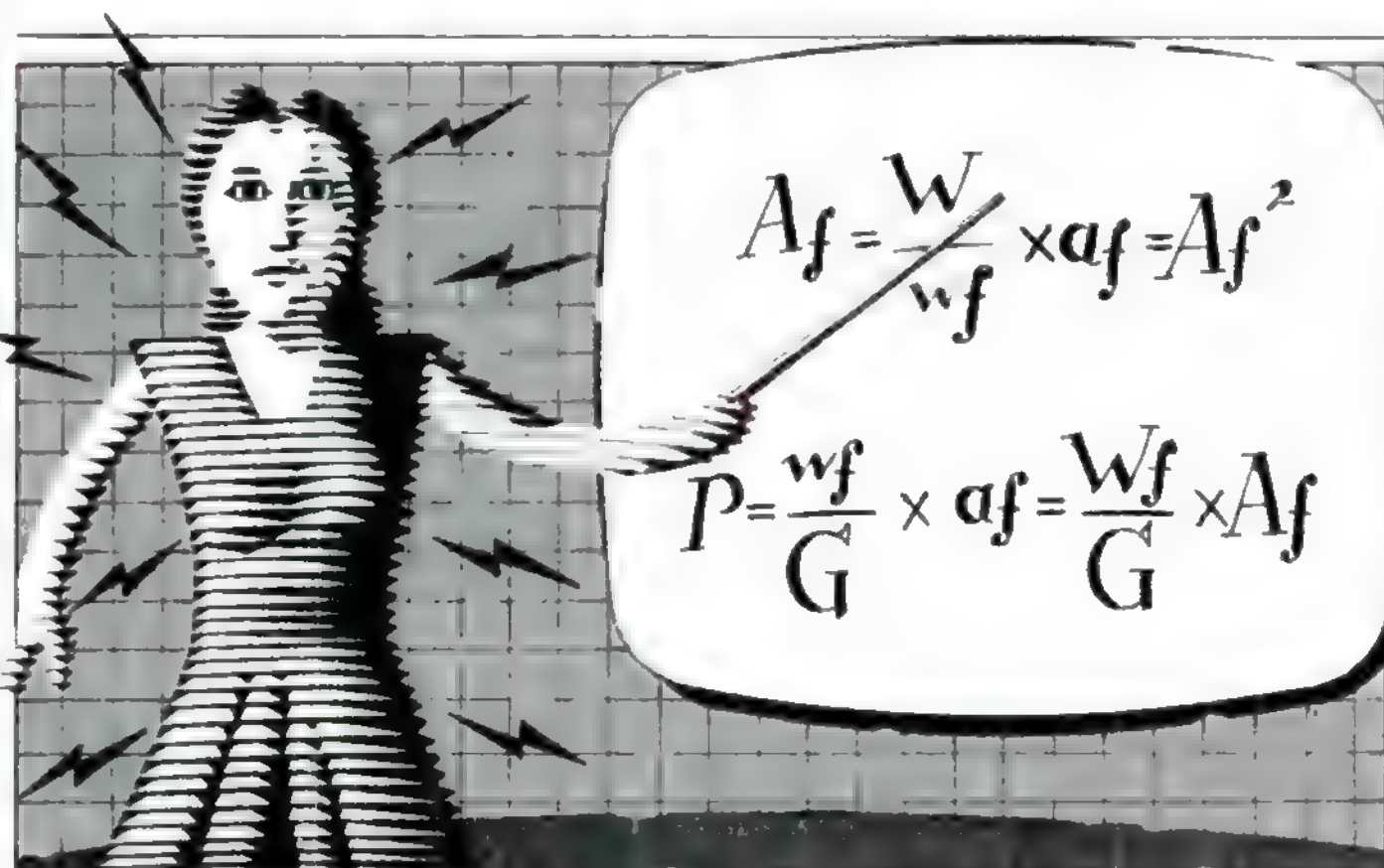
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CIRCLE 211 ON READER SERVICE CARD

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Electronic College

A new educational network from TeleLearning Systems, Inc., offers streamlined communications, individualized attention, and courses that range from parenting to telecommunications.



A multitude of on-line services are available to help you learn through your computer, but how many let you telecommunicate with an individual instructor? The Electronic University, unveiled in September 1983 by TeleLearning Systems, Inc., of San Francisco, does just that.

Students who register at the Electronic University can learn at their own pace from their homes or offices at any time, day or night, with a private instructor or professor. In spite of the service's name, not all of its offerings are on the college level. The Electronic University's catalog of 170 courses includes Early Learning-Brighter Children, Telecommunications, Parenting, American Management Association courses, and courses on personal

achievement, career development, computers, and test preparation. TeleLearning hopes to offer 500 courses by the end of this year.

This system is the brainchild of Ron Gordon, former chief executive of Atari and inventor of the Hand Held Computer and Pocket Language Translator. Gordon and his staff worked for months to create an operating system that handles input from a large variety of hardware. They eliminated the machine protocols, instructions, and access sequences and came up with the TeleLearning Knowledge Module, a modem that simply plugs into your personal computer and your telephone to automate the connection.

When a student registers for a TeleLearning course, the introduction and first

lesson are promptly transmitted to his computer by the TeleLearning instructor. The course book and other materials arrive by mail. Each transmitted lesson includes some instruction presented through the student's computer as well as a reading assignment and/or outside activity given by the instructor. Each course also includes periodic progress evaluations. Students complete evaluation assignments and send them to the instructor's computer for appraisal and critique. The instructor assesses the assignment, answers questions, and sends information and the next assignment to each student.

The basic "Knowledge Package," priced at \$79.95, consists of a course catalog and software. With Knowledge Module the cost is \$229.95; with Knowledge Module and Computer Literacy Course, \$279.95. Once students purchase the initial package, they can sign up for as many courses as they desire. Course fees depend on the instructor's hourly charges and range from \$35 to \$150 per course.

Three Goals

TeleLearning designed its communication system to fulfill three needs not satisfied by currently available telecommunications products. It is fully automated; it is priced for the mass market; and it reduces networking time.

Present telecommunications technology allows personal computers to emulate terminals for the purpose of connecting



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EDUCATION

with various public packet switching networks and databases. The traditional approach requires the user to fully grasp the telecommunication functions and manually perform them. The user is "live" during network and host computer interactions, which is time consuming, error prone, and expensive. Since the intelligence and hardware must be joined to the modem itself, cost can be greatly increased.

The TeleLearning approach is to treat the PC as both host and computer. All the intelligence is deposited into the PC via software, making it possible to store all the protocols necessary as a host computer and not merely as a terminal. Users need not bother with user codes, log-in sequences, or back and forth manual terminal identifiers. They can send and retrieve messages with a single keystroke. The TeleLearning Communications Operating System automates file transfers in both directions, provides message storage at the personal computer, and even transfers graphics without the necessity of an expensive "smart" modem.

TeleLearning has also devised a unique communications analysis structure to eliminate the common technical problems such as network shutdowns, host problems, and lost data. The TeleLearning analysis structure is programmed to monitor every function performed and every response received. If the proper response is not registered, the TeleLearning analysis structure will automatically correct the problem or choose another communications route.

TeleLearning uses three public packet switching networks: Tymnet, Telenet, and Uninet. If any problem is experienced with the primary network connection, the system itself switches to the secondary network or even to the third.

To correct transmission errors (losses, for example, or dropped or miscommunicated bits of data), TeleLearning has integrated into its communication analysis system an error detection and correction protocol between the personal computer

and the TeleLearning host. Whenever the system detects an error, the high level protocol will transmit the proper information.

TeleLearning has also developed a Course Translator System that helps instructors prepare text, graphics, and sound for their courses. This system translates information into proper coded output; it is then transmitted electronically to the host computer and stored on a diskette, cassette, or ROM cartridge. This coded

**Students who
register at the
Electronic University
can learn at their
own pace from their
homes or offices.**

output, which can be accepted by a variety of home and personal computers, interacts with the TeleLearning Communications Operating System.

The Electronic University concept has tremendous potential benefits for the handicapped and retarded, the elderly, housewives with children, and students who live far away from schools or are unable to attend classes due to illness. In fact, the Electronic University's first student was Bobby Cugini, a double amputee who enrolled in an English composition course for college credit applicable to Edison State College. (The university itself has not yet been accredited.)

To maximize the potential of an electronic university, we must become accustomed to taking courses staring at a CRT screen. Self-motivation and honesty will be important factors in determining whether or not the new medium can work.

Wayne R. Smith is a free-lance writer and a graduate student at Brigham Young University in Utah.

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ComRiter CR-III

A daisy wheel printer offering a bidirectional print speed of 23 characters per second, a 132-column carriage, and two-color printing capabilities with an appropriate ribbon. Other features of the printer include a 5K RAM buffer, compatibility with the Diablo 630 protocol, and either a parallel or serial interface.

Special print features of the CR-III printer include superscript and subscript, backspacing, underlining, boldface, double striking, and proportional spacing. Four ribbon options are available, including single-strike or multi-strike film, fabric, and red bobbin.

The printer's 96-petal print wheels are easily changed, and a variety of alternate fonts are available, including foreign language character sets.

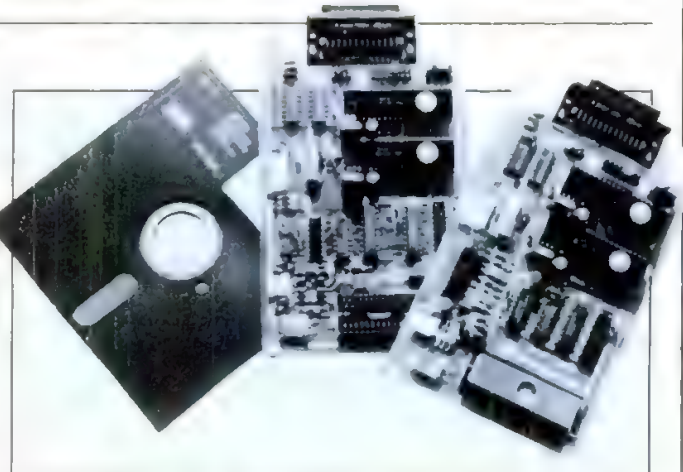
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8748/8749 Development System

A hardware/software package for developing applications code for 8748 or 8749 EPROM microprocessor chips. The CYP-8049 is a ready-to-assemble programming board that connects to



8748/8749 Development System, Cybernetics Micro Systems

the user's system via an RS-232 interface for programming, verifying, and reading the contents of 8748/8749 chips. The board works with Intel-format Hex files, programming one line at a time. In addition, the programmer board can compare a programmed part against a Hex file and

can also read out a part.

The software package for the CYP-8049 is designated CYS-8049, and includes a Symbolic Assembler that takes the standard Intel mnemonics as source code input and generates an Intel-format Hex file as output to the CYP-8049 board.

Source code programs can be created with standard editors, including Edlin and WordStar. The program's driver routines send the Hex files over the serial port to the programmer board one line at a time. A reply is generated by the board after each line, indicating the status of the programming operation. The driver software takes the appropriate action after each response, continuing the programming operation for the entire Hex file and repeating records as required.

(List Price: Board alone \$195; with software \$325)

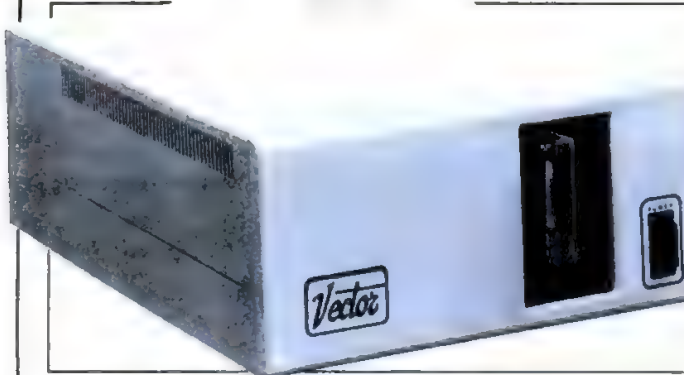
Requires: PC-DOS 2.0.



ComRiter CR-III, Comrex International

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CIRCLE 789 ON READER
SERVICE CARD



VectorSafe Series VS, Vector Electronics Co., Inc.

VectorSafe Series VS

A line of 8-inch Winchester hard disks with 83, 132, or 212 megabyte storage capacities available with or without an integral streaming cartridge tape backup, in standalone or rack-mount configurations. The Winchester have an 11.5 kilobit-per-inch recording density and a 1.2 megabyte-per-second data transfer rate. The 83 MB and 132 MB Winchester each have three platters; the 212 MB unit has five platters. Average access times for the three models are 45msec for the 83 MB, and 39msec for both the 132 MB and 212 MB units.

The integral streaming cartridge drive has a formatted capacity of 45 MB per .25-inch tape, 9-track cartridge. It has a 90 kilobit-

per-second data transfer rate and 8 kilobit-per-inch recording density. The 9-track transport, with read-while-write heads, uses serpentine recording techniques to

avoid unnecessary rewinding between tracks.

All three models incorporate internal power supplies, cooling fans, and interfaces for host controller/adaptor cards.

(List Price: 83 MB \$9,864; 132 MB \$11,343; 212 MB \$13,462)

Vector Electronics Co., Inc.
12460 Gladstone Ave.
Sylmar, CA 91342
(213) 365-9661
TWX: 910-496-1539

CIRCLE 791 ON READER
SERVICE CARD

Quick Disk

An external memory device containing from 128K to one megabyte of RAM. The unit can operate about 120 times faster than a Winchester disk drive, or approximately 190 times faster than a floppy disk drive, when

performing common data transfers across a local area network. Quick Disk can be used independently as an additional storage device (RAM disk, print buffer), or in combination with a floppy disk drive or Winchester disk as a disk cache.

Five models of the Quick Disk unit are available, with 128K, 256K, 384K, 512K, or one megabyte of storage capacity.

(List Price: \$2,795 to \$8,595, depending upon storage capacity)

Santa Clara Systems
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IDS Model 6220 Limited Distance Modem

A modem for asynchronous communications at speeds up to 9600 baud across distances up to 16 miles. The device can operate over private or leased, 2- or 4-wire, twisted-pair lines in both point-to-point and multiple-drop network type configurations.

rations.

The modem provides internal strap selections for the following features: constant or controlled RTS; three selectable transmit levels; 2- or 4-wire operation; normal or high receiver impedance; separate or common-frame/signal ground; and 125-millisecond or 8.5-millisecond RTS/CTS delay. The unit employs a pulse modulation scheme that varies the transmit signal polarity on a balanced line. Transmit and receive lines are transformer coupled, eliminating the need to maintain line DC continuity. In addition, the Model 6220 contains a manually adjustable equalizer with an LED to indicate positive equalization.

(List Price: \$300)
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(401) 333-6200
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IDS Model 6220 Limited Distance Modem, International Data Sciences, Inc.



Model 500 Monochrome Display, Datacopy Corp.

Model 500 Monochrome Display

A high-res monochrome display with 200 dot-per-inch bit-mapped resolution capability. The vertically-oriented display features a 15-inch diagonal screen that can produce 38,400 readable characters simultaneously. A full page of text can be displayed at once, including pictures, complex drawings, and three-dimensional graphics images.

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SERVICE CARD

Video Enhancer

A device that connects between a hi-res, non-IBM monochrome monitor and a color/graphics adapter board

in the user's system, producing high-resolution monochrome displays from RGB signals. The Model 100-2124-00 Video Enhancer eliminates grainy texture and can highlight text on colored backgrounds by converting the RGB color signal into 16 shades of amber, green, or gray (depending upon the monitor). The device also amplifies the video signal for increased maximum brightness or parallel operation of up to six monitors.

The Video Enhancer can be used with color adapter boards from IBM, Amdek, Plantronics (ColorPlus), Tecmar, USI Computer Products, Mylex, and others with RGB output. A 9-pin connector houses the circuitry, with a 5-foot cable to the monitor. Another 18-inch cable connects to the

light pen port for power.

The device is not recommended for use with the standard IBM monochrome monitor.

(List Price: \$79.95)

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Seattle, WA 98103

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CIRCLE 784 ON READER
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DASCON-1

An analog and digital I/O board designed to take up a single slot in an IBM PC. The DASCON-1 board functions as a precision, low-speed data acquisition and control system capable of interfacing directly with a user's application. Optionally, screw terminal, electronic, and electromechanical relay accessory boards are available for alternative interfacing to an application.

Analog inputs consist of four channels of 12-bit A/D conversion with a resolution of 500 microvolts. Optional switch-selectable gains of 10, 100, and 1,000 can extend the resolution to 0.5 microvolts per bit on two channels, while the other two channels contain switch-selectable RTD interfaces for built-in thermal measurement capability from -200 to 650 degrees Celsius (+/- 0.2 C). All channels have switch-selectable 30dB (60 Hz) input filters to help enhance signal integrity.

Optional analog outputs consist of two channels of 12-bit D/A with switch-selectable output ranges of +/- 10, 5, and 2.5 volts, or +5 and +10 volts.

The board includes 12 digital I/O lines that are TTL/CMOS compatible, comprised of one 8-bit port and one 4-bit port. The ports may be both output, input, or mixed according to the user's needs. Also included are two voltage reference outputs, adjustable between +/- 6.8 volts at 5 mA. Two 1 mA constant current sources are provided (-10 to +2.5 volts compliance) for exciting RTDs, semiconductor thermal sensors, measuring impedance, or providing user-selected outputs.

(List Price: \$485; 2-channel analog output option \$70)

MetraByte Corp.

254 Tosca Dr.

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(617) 344-1990

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An encryption/decryption device for protecting sensitive data transmissions. The FIMAC system is fully compliant with the Financial Institution Message Authentication Standard (ANSI X9.9, 1982), and can be used without modifications to the user's system.

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available in two configurations, for either in-circuit use or as a peripheral attached to a user's system. Both models provide one RS-232 B/C port for connection to the user's DTE line. Model ISM-244, for in-circuit placement, also offers a second RS-232 port for connection to DCE lines. Software interfaces to both models are the same, following the rules of ANSI X9.9 for an explicit authentication message. Data that is not to be authenticated can flow through the FI-MAC devices unaffected. (List Price: \$1,995)

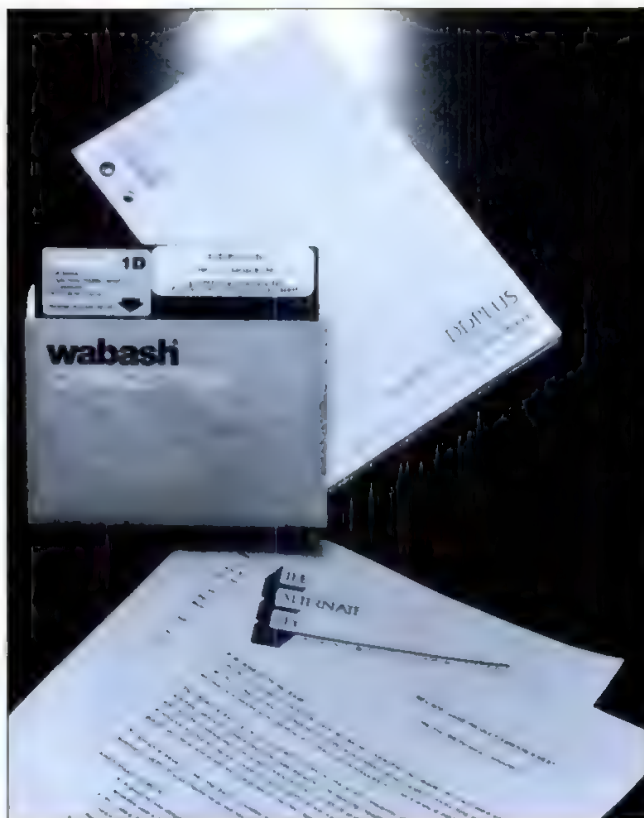
Analytic Communications Systems
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Reston, VA 22090
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CIRCLE 785 ON READER
SERVICE CARD

SOFTWARE

DDPLUS

A text formatting program providing a range of options for formatting documents produced by *WordStar* and other ASCII word processors. The software presents the user with menus to access text formatting and printing controls. Through the menus, *DDPLUS* can regulate page margins, line spacing, headings, footings, file selection, and printer control sequences. Text can



DDPLUS, The Alternate Key

be printed in multiple columns with microjustification on either dot matrix or letter quality printers.

Additional features of *DDPLUS* include *WordStar* and *MailMerge* dot commands and control codes, as well as user-defined control codes; 58 double-dot commands that produce quotation indentations, margin sub-headings, and multiple page headers and footers; user-definable macro keys that can automatically create numbered and indented outlines and lists; and, finally, the ability to direct printouts to either parallel or serial

printers.

(List Price: \$39.95)

Requires: 96K RAM, one disk drive, PC-DOS, *WordStar*.

The Alternate Key

P.O. Box 148
Williamston, MI 48895
(517) 484-1664

CIRCLE 775 ON READER
SERVICE CARD

MicroSpell

A spelling checker program with a dictionary of 58,795 words held in RAM during use. In most cases the program presents three alternative spellings for a suspect word, using pattern-match-

ing heuristic techniques. The user can replace the misspelling with one of the alternatives with a single keystroke.

MicroSpell checks text at an average of 6,000 words per minute. Misspelled words are displayed in context, with up to six lines of surrounding text. Twenty user-selectable proofreading options customize the software for particular applications.

The spelling checker's dictionary includes proper nouns, such as the names of cities, states, and countries, and over 700 English names. In addition, the user may add up to 20,000 words to the dictionary.

MicroSpell is compatible with *WordStar* and other word processing programs that store text in standard ASCII files.

(List Price: \$139)

Requires: 96K RAM, two disk drives, PC-DOS or CP/M-86, word processing program.

Trigram Systems

3 Bayard Rd., #66
Pittsburgh, PA 15213
(412) 682-2192

CIRCLE 776 ON READER
SERVICE CARD

Personal Accounting System

A personal finance management program featuring routines for checkbook-balancing, paying bills, and controlling income and ex-

SOFTWARE

penses. Using the cash accounting method, the book-keeping system also contains budget and check-writing options as well as the ability to make prior-year comparisons of data.

(List Price: \$99)

Requires: 64K RAM, one disk drive, PC-DOS.

Taranto & Associates, Inc.
P.O. Box 6073

San Rafael, CA 94903

(800) 227-2868

(415) 472-2670

CIRCLE 774 ON READER
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SongWright

A music processing program, enabling the user to compose, save, edit, transpose, play, and print music. *SongWright* features a two-octave range, seven key signatures, multiple time signatures, and chordal harmony. A unique printing capability allows the user to print sheet music using a dot matrix printer, with precise alignment



SongWright, M. Hulett

of lyrics, chord notations, and notes.

(List Price: \$24.95)

Requires: 64K RAM, one disk drive, PC-DOS, Epson graphics printer.

M. Hulett

928 Fillmore St.

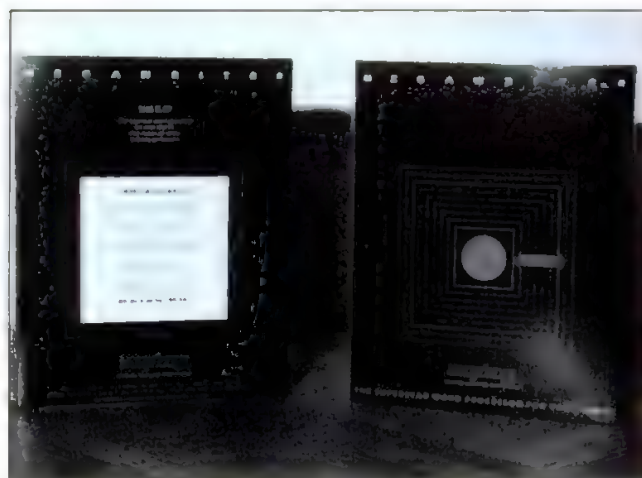
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CIRCLE 772 ON READER
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LETTER EXPRESS

An electronic mail program for *dBASE II* users, providing a means to access the U.S. Postal Service's Electronic Computer Originated Mail (E-Com) system. The program is designed to meet all of the requirements set by the U.S. Postal Service for accessing the E-Com system, and includes a "test" transmission to insure rapid certification and acceptance of the user's transmissions by the Postal Service. Once the certification process has been completed, the user may



MegaSpell with MegaWriter, Megahaus Corp.

create messages using the software's built-in word processing system.

LETTER EXPRESS can store and retrieve an unlimited number of letters and addresses taken from a user's *dBASE II* files. Any letter can be changed, deleted, or updated at the user's discretion, and files can be accessed and reviewed by Zip Code prefix or alphabetically. It permits the user to draw boxes and custom forms on the display screen, and output the result to a printer for review prior to transmission.

(List Price: \$200)

Requires: 128K RAM, two disk drives, PC-DOS, modem, *dBASE II*.

Software Marketing Group

16013 W. 150th St.

Olathe, KS 66062

(913) 791-2720

CIRCLE 777 ON READER
SERVICE CARD

MegaSpell

A spelling checker program for the *MegaWriter* word processing program. The software addition includes a 40,000-word dictionary, to which the user can add up to 10,000 words. *MegaSpell* has only five commands, yet can correct multiple occurrences of a misspelled word with a single key-stroke.

The spelling checker displays misspelled words in context and checks entered corrections against its dictionary. The software ignores *MegaWriter*'s embedded text-formatting commands. (List Price: \$99)

Requires: 64K RAM, one disk drive, *MegaWriter*.

Megahaus Corp.

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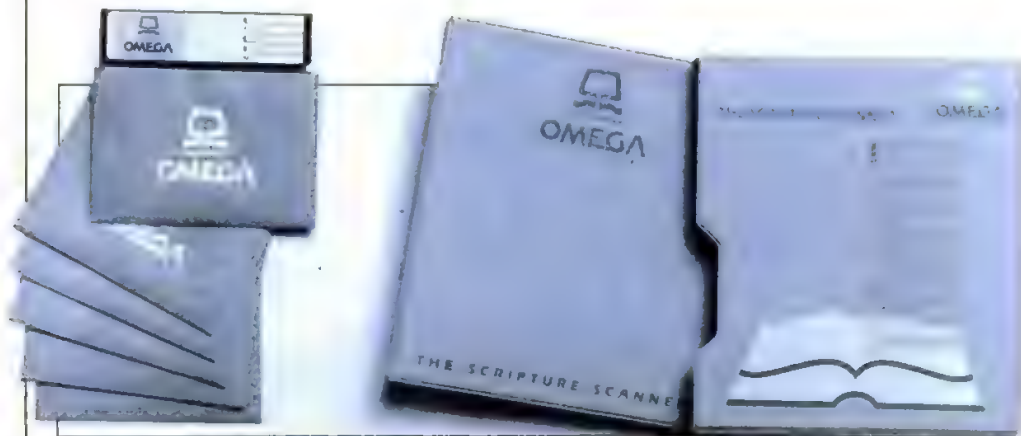
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*Except in Alaska and Hawaii. In Illinois, call 1-800-942-8881.





Scripture Scanner, Omega Software

Scripture Scanner

A menu-driven program containing the complete text of the Bible. The software has three operating modes. Scripture Mode permits self-paced scripture study, printing of selected verses, searches for key words or phrases, as well as a Window function for concurrent passage display to compare texts within or between Testaments.

Concordance Mode supports creation of reference files, topical scanning, review and revision of files, and file combination of similar topics. Random reference files may be sorted into book-chapter-verse order or sequence. A Word Processing Mode supports text file creation and automated Bible text entry. Editing uses standard keys and commands.

Scripture Scanner also works with other word processing programs and uses special characters to support insertion of flagged Biblical

references.

(List Price: Entire Bible \$249.95; New Testament \$159.95; Old Testament \$129.95)

Requires: 96K RAM, one disk drive, PC-DOS.

Omega Software
P.O. Box 355
Round Rock, TX 78680
(800) 531-5223
(512) 255-9569

CIRCLE 779 ON READER SERVICE CARD

Cascade I CAD System

A computer-aided-design (CAD) program capable of placing as many as 255 different overlays on a displayed design, displaying each overlay separately. Other features of this menu-driven CAD system include the ability to group together design objects; panning and zoom capabilities; a "pack" function, permitting data to be compressed to save space on a diskette; and an early-warning feature that notifies the user when the disk is 95

percent filled. The program's master menu offers the user 20 choices, each with multiple options.

Drawings created with *Cascade I* can incorporate both aligned, directional, and multidirectional text. In addition, both scaled and unscaled drawings can be produced using either English or metric units. The

software can also direct the activities of multipen plotters, creating drawings up to 24 x 36 inches in size.

Cascade I is compatible with the manufacturer's Complete line of CAD systems, permitting upgrades to more complex systems using the same data files.

(List Price: \$895)

Requires: 256K RAM, two disk drives, PC-DOS, joystick or digitizing tablet.

Cascade Graphics
1000 S. Grand Ave.
Santa Ana, CA 92705
(714) 558-3316

CIRCLE 781 ON READER SERVICE CARD

NewWord

A word processing program with a command structure similar to *WordStar* with *MailMerge*. Editing func-



Cascade I CAD System, Cascade Graphics

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tions such as insert, delete, and move characters, words, or lines are performed with few keystroke commands.

Advanced editing features provided by *NewWord* include Undo and Unerase, allowing the user to recapture accidentally deleted text with a single keystroke; Page Finding; Search/Replace for words, phrases, titles, and symbols; and Boilerplate Text Files for assembling documents from often-used blocks of text.

NewWord also offers text-formatting features such as simplified procedures for producing repeated headers and footers of up to three lines. A mail-print feature enables the user to print names and addresses on let-

ters, mailing labels, and envelopes automatically. The software also includes facilities for accessing and programming the special print features available with many printers.

(List Price: \$249)

Requires: 96K RAM, two disk drives, PC-DOS or CP/M-86.

Rocky Mountain Software Systems

1280-C Newell Ave., #1000
Walnut Creek, CA 94596
(415) 680-8378

CIRCLE 769 ON READER
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Guardian of Gorla

An arcade-style game program designed to maximize the use of a joystick. The game provides the player with full 360-degree control of the playing figure's direc-

tion, as well as continuously variable speed through the use of the joystick.

Guardian of Gorla includes features such as enemy drones, homing missiles, spy ships, explosive mines, ion bombs, and shield destruction/regeneration. Also featured are an Order of the Guardian ranking system, high-score saving, a training game, and color graphics.

(List Price: \$31.95)

Requires: 64K RAM, one disk drive, PC-DOS, color/graphics adapter, joystick adapter, joystick.

SIMCO Software

2349 Prancer
New Orleans, LA 70114
(504) 392-1331

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Bomb Zone

A game program offering 30 levels of difficulty. The player must overcome all obstacles to destroy menacing Killer Drones to advance to a higher level. The game features color graphics and sound effects, and can be used with keyboard or joystick.

(List Price: \$24.95)

Requires: 64K RAM (PC-DOS 1.1), 96K RAM (PC-DOS 2.0); one disk drive, color/graphics adapter.

Fantasy Research, Inc.

2028 Casa Loma Ct.
Grapevine, TX 76051
(817) 488-9313

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BREEDER

A game program that simulates the growth patterns of cellular colonies using the rules of genetics. *BREEDER* is written in 8088 Assembler, and allows the display of up to ten new generations per second in a universe of 160 by 100 cells. The created cell patterns can be printed using the standard PC-compatible printer. A store and retrieve library of 100 patterns is included with the software.

(List Price: \$39.95)

Requires: 64K RAM, one disk drive, PC-DOS.

Protium

5580 La Jolla Blvd., #399
La Jolla, CA 92037
(619) 481-1969

CIRCLE 738 ON READER
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Bomb Zone, Fantasy Research, Inc.

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The design of these projects permits teachers to integrate into the instruction such various specialized subjects as accounting, secretarial, paralegal, paramedical drafting, electronics, etc. A computer-assisted instruction program provides teachers with the opportunity to write computer programs for specific subjects such as math, science, spelling and social studies.

Also included are instructor guides containing 600 hours of teacher preparation time, sample educational software, transparency masters, and student workbooks.

(List Price: Site License: \$1,250-\$5,000)

Requires: 16K RAM, one disk drive, PC-DOS.

Career Publishing, Inc.

P.O. Box 5486

Orange, CA 92667

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Disk Analyzer, Nortronics Co., Inc.

Disk Analyzer

A floppy disk drive testing program that automatically tests for five critical areas of drive operation. The software, designed to be used by nontechnical persons, uses an efficient menu-driven format to begin all of the test routines.

From the menu, the user can choose to test a drive's radial alignment, disk spin speed accuracy, read/write accuracy, clamping accuracy, or all five tests at once, for either drive A: or B:.

The program is available in two versions on the same diskette, one for the IBM PC and one for Apple computers. When booted, the correctly formatted version is automatically called up by the user's system. Other features of the *Disk Analyzer* program include

monochrome or color graphics, help screens, informational screens on general computer care, and information on other care products offered by the program's manufacturer.

(List Price: \$39.95)

Requires: 64K RAM, one disk drive.

Nortronics Co., Inc.

8101 Tenth Ave. N.

Minneapolis, MN 55427

(612) 540-8674

CIRCLE 782 ON READER
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PREVIEW-PAK

A demo sampler, consisting of a box of 10 diskettes, each containing a full demo of a popular software package—one sample from each of ten major categories, ranging from word processing and database management to graphics, operating

systems, and small business accounting.

The disks are designed to be reusable, providing the purchaser with blank diskettes after the demos have been sampled. The sampler packages also include tutorial booklets and software discount coupons.

(List Price: \$40)

Preview Publishing Co.

534 Third Ave.

San Francisco, CA 94118

(415) 752-3336

CIRCLE 767 ON READER
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MIST+

A communications program capable of linking the user's system to a variety of on-line commercial databases and services such as CompuServe and MCI Mail. Either at the user's command or timed to run unattended when rates are low, *MIST+* can be instructed via a single keystroke to automatically connect with a service, send and receive files, search on-line databases, disconnect, and, if needed, automatically initiate a session with another system.

MIST+ is distinguished by its series of interactive prompts for information from the user, which is used to complete tasks. The software can prompt the user for such information as the names of persons to whom messages are to be sent, what database to search, by what keywords, and the

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IQ TECHNOLOGIES, INC.

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SOFTWARE

name of the file to which the search results and waiting messages should be recorded. All telecommunications parameters are set and all host commands are transmitted automatically.

A multilevel password system is incorporated within the software, supporting up to 900 individual users.

(List Price: \$295)

Requires: 64K RAM, one disk drive, PC-DOS, Hayes Smartmodem or equivalent.

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(800) 368-5787

(202) 887-5440

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Tax Strategist

A program for evaluating tax reduction strategies, capable of computing income tax liabilities for up to a 10-year period. The program calculates the tax shelters needed to reach a desired tax reduction goal, using tax tables, income averaging, and alternative minimum tax techniques. It can calculate up to 10 years of different alternatives, selecting the best strategies for each year.

(List Price: \$395)

Requires: 128K RAM, two 320K drives, PC-DOS.

XQ Software

4357 Park Dr.

Norcross, GA 30093

(404) 923-2880

CIRCLE 744 ON READER
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MasterChart

A turnkey medical database management system. *MasterChart* provides for the entry, retrieval, updating, and printing of patient care information in chart form. Its database, created through regular updates of patient

dot matrix printer. Option II offers one 320K drive and a 10MB hard disk.

MasterChart software and preprinted report forms include modules for recording Physicians' Orders, Plans of Care, Diagnosis History/Discharge Summa-



MasterChart, Computran Systems Inc.

care data, can be easily accessed for hard-copy reports through the system's built-in reporting facilities. Two versions of the *MasterChart* system are available, each incorporating all needed hardware. Option I includes an IBM PC with 192K RAM, two 320K drives, a 12MB (or larger) hard disk, a monochrome display, and a 200 character-per-second

ries, ADL/Nurse's Orders, Documentation Sheets, and Face Sheets for each patient.

(List Price: Option I \$8,685; Option II \$7,304)

Computran Systems Inc.

5150 SW. Griffith Dr.

Beaverton, OR 97005

(800) 547-4801

(503) 643-6730

CIRCLE 778 ON READER
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The Organizer

An enhancement program for Lotus' 1-2-3 Version 1A spreadsheet program, providing the user with a series of file selection menus. Also included are functions for creating new files, and a menu-creation form with one-key abort, help, switch files, and quit commands. The user may add custom commands to the menus and create any number of sub-menus to access worksheet files easily.

The software permits 1-2-3 files under 20K in size to be processed using a system with 128K RAM installed, instead of the 192K RAM normally required. This is accomplished using *The Organizer's* File-Link feature, which accesses files through a branching tree system reached via the software's menus.

(List Price: \$89; manual alone \$12)

Requires: 128K RAM, two disk drives, PC-DOS, Lotus' 1-2-3.

The Whiterock Alternative

8255 15th NE

Seattle, WA 98115

(206) 527-5173

CIRCLE 765 ON READER
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PC-B4

A terminal emulator program permitting the user to link to MAI Basic Four minicomputer systems. The terminal emulator operates as a standard 7270 video

SOFTWARE/ACCESSORIES

display terminal transmitting at 9600 baud. The software includes text file transfers between the user's system and the Basic Four, the ability to send output from the Basic Four to a local IBM printer, and the ability to print text files from the IBM PC on the Basic Four printer.

Available options for the *PC-B4* program include software providing for bidirectional transfers and data reformatting between the user's personal computer and the host system, and software allowing the Basic Four to function in place of the IBM PC printer for use by IBM PC applications programs.

(List Price: \$300; Printer option \$100)

Requires: 96K, one disk drive, PC-DOS, asynch communications port, parallel printer.

Sigma Computer Resources
801-1155 W. Georgia St.
Vancouver, BC, V6E 3H4
(604) 688-8271

Telex: 04-352848

CIRCLE 739 ON READER
SERVICE CARD

Crossave

A utility permitting the user to back-up large files from a hard disk drive to floppy disks, where those files exceed the normal capacity of a diskette. *Crossave* operates in one of two modes: the first can save and/or restore a file or selected group

of files; the second mode backs-up and restores all of the user's files on the Winchester drive.

The software makes use of file compression techniques to reduce the amount of storage space a file requires on a diskette. The software then expands the file to its full size when required to restore the data to the Winchester drive.

Other features of *Crossave* include high-speed transfers through the use of read/write buffers, and the ability to display the file directories of both the hard disk and diskette on the same screen.

(List Price: \$99)

Requires 64K RAM, one floppy and one hard-disk drive, PC-DOS 2.0 or CP/M-86.

Award Software
236 N. Santa Cruz Ave.
Los Gatos, CA 95030
(408) 395-2773

CIRCLE 743 ON READER
SERVICE CARD

LAZYCODER-SCREEN II

A screen editing program, designed to aid programmers in the creation of data screens for three types of file maintenance programs. Screens may be designed using the top 23 lines of the display as an electronic blackboard. The cursor can be positioned anywhere within this blackboard, with prompts, graphic characters,

and data input fields placed where desired. Twelve different types of input fields are supported, with up to 300 per screen. Over 25 functions are provided by the software to simplify screen design.

The three types of file maintenance programs supported by *LAZYCODER-SCREEN II* include sequential, random, and indexed files. A high-speed index support module (*FABS/PC*) is included with the software.

Both color and monochrome monitors can be used to design screens, and the program generator can be modified by the user to include custom code sequences in the generated code. Generated programs can make use of the numeric keypad as well as the cursor control keys to enter data to a designed screen.

(List Price: \$450; manual and demo disk \$25)

Requires: 64K RAM, two 320K disk drives, PC-DOS 2.0, BASICA.

Nelson Data Resources, Inc.

P.O. Box 24247
Omaha, NE 68124
(402) 397-3030

CIRCLE 764 ON READER
SERVICE CARD

ACCESSORIES

Tel-A-Switch

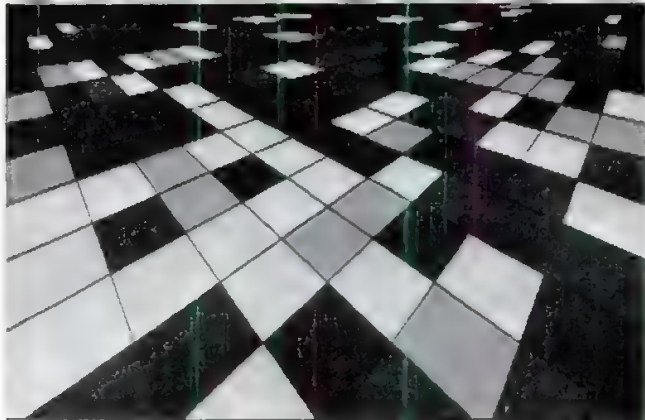
A power switch that allows the user to remotely power-up or shut down a PC-XT via a telephone line. Tel-A-Switch uses the signal generated by the Hayes Smartmodem to perform the power-up, providing up to 1,200 watts of line current (equivalent to the power needed to operate three PC-XTs). A lock-on feature prevents power loss due to interruptions that can occur on the phone line.

Tel-A-Switch can also be



Tel-A-Switch, Texas Technology Co.

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PC MAGAZINE • JUNE 12, 1984

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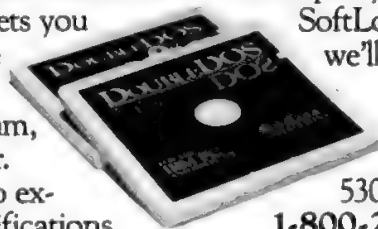
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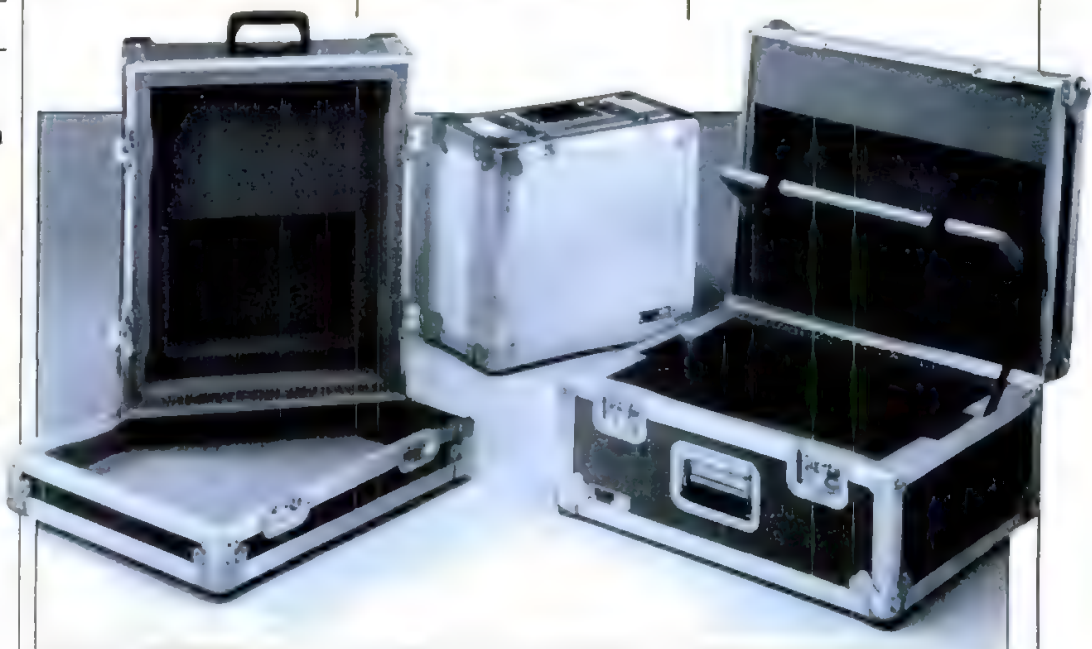
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ACCESSORIES

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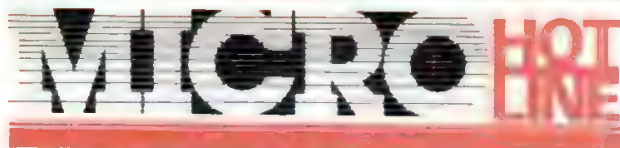
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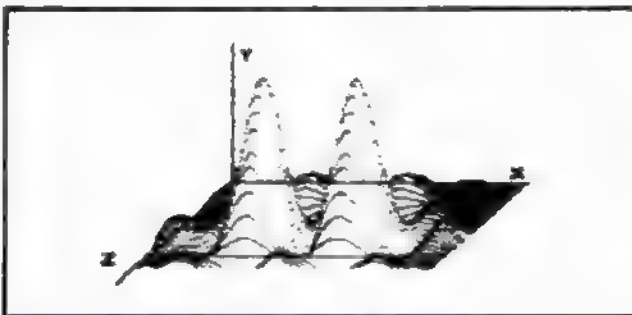
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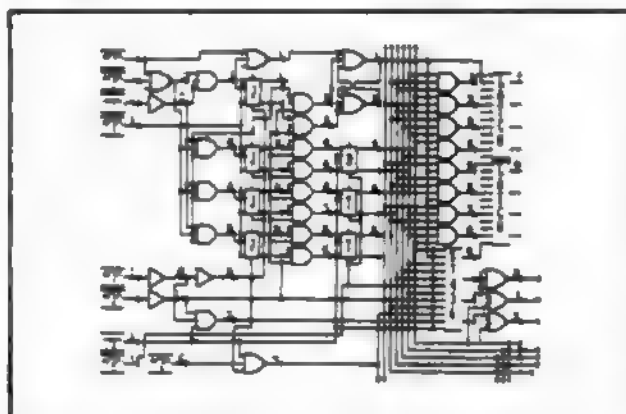
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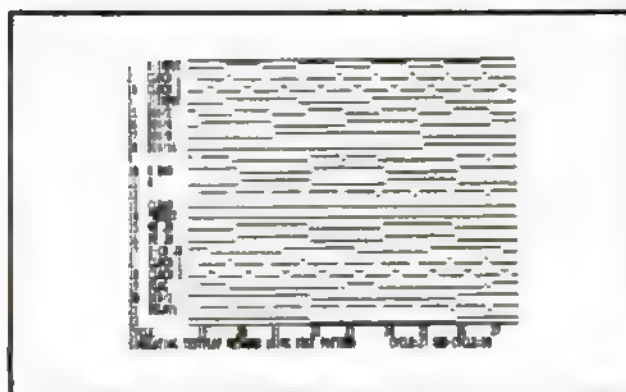
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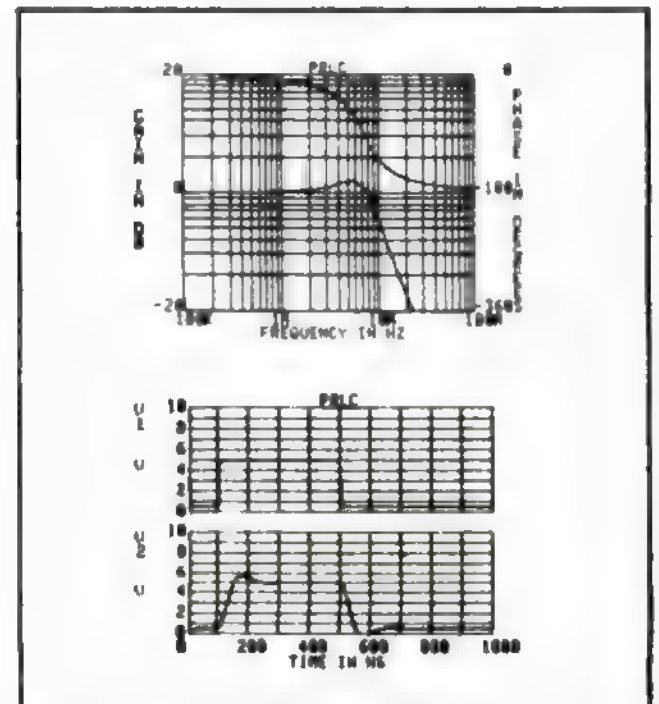
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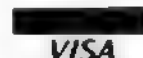
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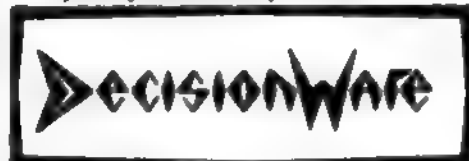
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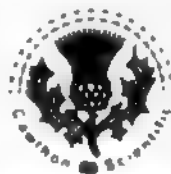
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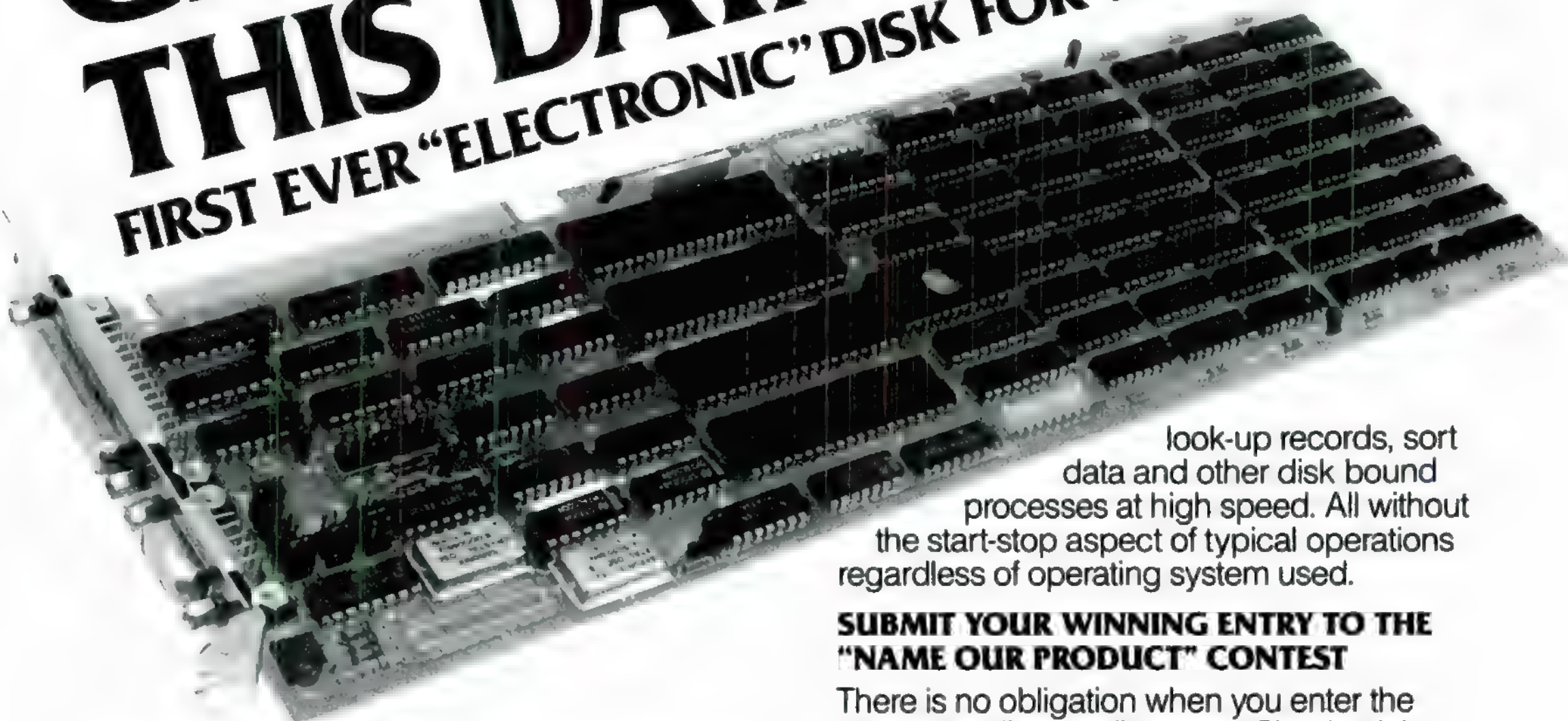
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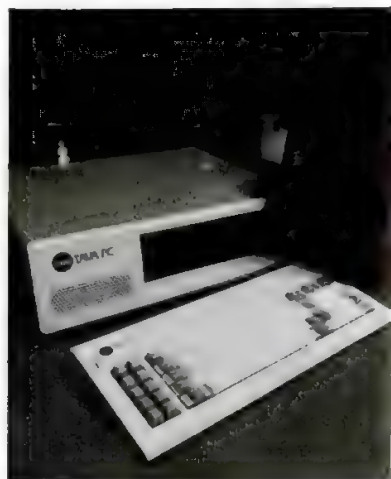
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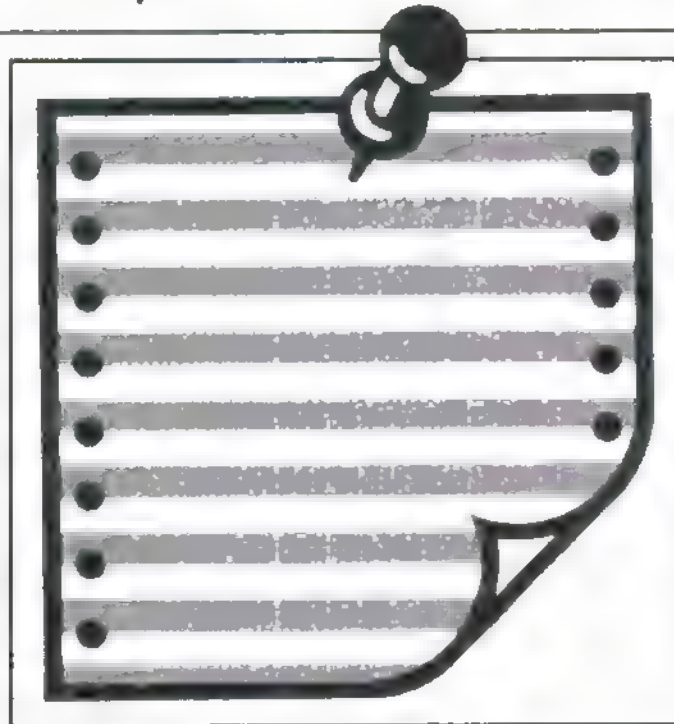
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PC User Groups: IBM Signs On

IBM has finally recognized the importance of PC user groups and is starting a program to help support them. IBM will provide access to a newsletter, a phone line, and a bulletin board.

Personal computer user groups are a direct spinoff of mainframe computer groups such as Share and Guide, which were formed in the early 1960s to share information. They were independent organizations that began with programmers handing each other key-punch cards. Eventually the groups grew and acquired IBM's official blessing. Until recently, IBM has not provided any direct support to its microcomputer users, particularly PC owners. Most of its emphasis has been on providing information to the IBM Product Centers and authorized dealers. It was assumed that these vendors would pass along the information to individual users. Not surprisingly, this method has proved less than adequate. A large number of IBM PC user groups have cropped up across the country and have tried to fill some of the gaps left by this ineffective support.

IBM is well aware of the many valuable services provided by the user groups and is now attempting to assist them in their efforts. "User group support is not new to IBM," said E. Gene Barlow, manager of the IBM PC User Group Support Department. "We have been providing support to internal IBM user groups for the past 2 years. We are now extending that support to other user groups as well." Initially at least, this support will take the form of a monthly newsletter, a direct



phone line, and a bulletin board system.

The monthly newsletter will contain the "very best technical articles appearing in local newsletters," said Barlow. To make this possible, user groups are being asked to regularly send their newsletters to the support department. IBM's newsletter will also contain information about recently announced products similar to the announcements available at Product Centers and authorized dealers. Other sections of the newsletter will include tips and techniques, editorials by user group presidents, and product updates.

The direct phone line is intended to give user group officers a communications link with the IBM PC User Group Support Department in Boca Raton. User group officers will be able to obtain assistance in forming new groups, ask questions about

other group activities, and make general inquiries about IBM PC products. IBM emphasizes that this service is not a technical support line and that technical questions will not be answered.

The phone line will be active during the department's normal office hours of 8:00 a.m. to 4:30 p.m., Eastern time. Barlow adds that an answering machine will take messages during off-hours and when staffers are not available. The line will be a standard commercial line, not an 800 number. "This is to keep expenses reasonable, at least initially, and to try to limit the amount of time any one person can monopolize the line. An 800 number or other means of communicating electronically with user groups are options for the future," said Barlow.

The support department is also implementing a bulletin board system that will allow PC user group officers to communicate with other user groups and with the User Group Support Department. Barlow hopes that the bulletin board will act as vehicle for the exchange of technical information among user groups. "This same bulletin board system," said Barlow, "is used in approximately 15 to 20 of our internal IBM sites. It is software that runs on an IBM PC-XT, and it has most of the standard features found on other bulletin boards. It will be a single-user bulletin board. As volume increases we will try to

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meet the demand and allow multiple users on one system or perhaps create multiple systems linked together with a rotating phone line."

"The content of the bulletin board system will be very similar to the newsletter. For example, it will contain announcements of new products as soon as they are available, information about user group activities that would be of interest to other groups, and a section where user groups can exchange technical information among themselves," he said.

Additional Services

Some additional services are anticipated. IBM would like to provide guest speakers on a regular basis to each user group, but, according to Barlow, "It is very expensive and very difficult to meet their schedules. Perhaps if we presented a particular technical topic to a few user groups, we could package the materials with an audio tape or some type of script. We could then send the package out to other user groups and allow them to make the presentation. That might be a good way of increasing access to technical information."

Assistance in the exchange of IBM PC public domain software is contemplated, but Barlow explained that this is a very sensitive area. "Verification as to whether a particular piece of software is in the public domain is a difficult task. We would not want to be involved in the infringement of copyright laws. I see our effort primarily helping user groups establish standards of documentation for public domain libraries. We might also be able to ease the exchange of lists of programs that are in public domain libraries."

When asked if IBM would actually be involved in the exchange of public domain software, Barlow replied, "There may be some programs that we would like to distribute. For example, a program was distributed about a year ago that allowed individuals who have both color and monochrome displays to switch between them more easily." This code has since been

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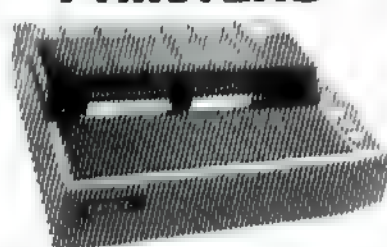
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placed in DOS 2.0. When asked if IBM would assist in the exchange of a public domain program developed by an internal IBM user group member, Barlow explained that the individual has the right to make it available to the public but indicated that IBM has not yet decided whether they would get involved.

New Directions?

New directions are possible. "We have worked with internal user groups, and we've talked to many external user groups. We think we have a feel for the services that user groups would like to

IBM intends to complement the support that is already provided by the local dealers.

have us present, but we are open to suggestions. IBM is willing to listen to and work with the user groups to do whatever is necessary to further the use and knowledge of the IBM PC," said Barlow.

An IBM-sponsored national convention of PC users is one possibility, Barlow commented. "I think there are advantages to user group presidents and officers getting together to exchange ideas," he said. "Whether this can best be accomplished at a national convention, local subconventions, or even in conjunction with major trade shows, remains to be seen."

The involvement of authorized dealers and IBM Product Centers with PC user groups is another important issue. "We still feel that the user group's first line of support is the local dealer," said Barlow. "There are advantages and services that the local dealer can provide that we can't. In some cases, the local dealer could provide a meeting location for the user group, demonstration equipment, or a guest

speaker. These are things that IBM cannot do on a national basis. What IBM intends to do is complement the support that is already provided by the local dealers."

Barlow said he was not aware of any restriction on IBM Product Centers displaying user group literature. "My experience with authorized dealers has been that normally they will provide a sign or perhaps space for brochures that could be passed out. Some authorized dealers will mail user group newsletters to their customers. This is carried out on an individual basis. As for the product centers, I don't know if there is a specific company-wide restriction, or if it is individual policy. I'll be glad to look into it," Barlow added.

Registration

Established user groups will have no trouble registering for the department's services. IBM has already sent registration packets to all known groups. This packet contains a letter from Barlow, a summary sheet explaining the support program, a list of information IBM currently has on the group, a registration form to update the information on file, and instructions for filling out the registration form. New groups wishing to obtain an application should address inquiries to E. Gene Barlow, Manager, IBM PC User Group Support, Department 219/218, P.O. Box 3022, Boca Raton, FL 33432.

(Listings follow.)

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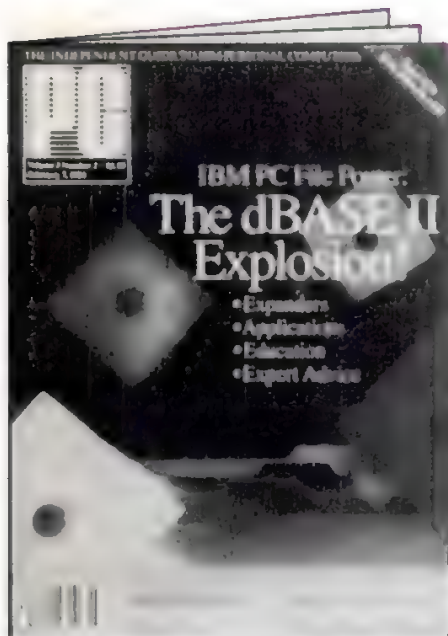
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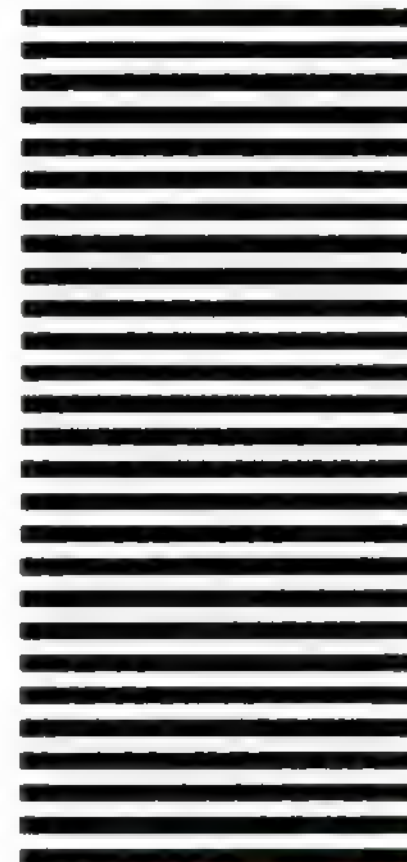
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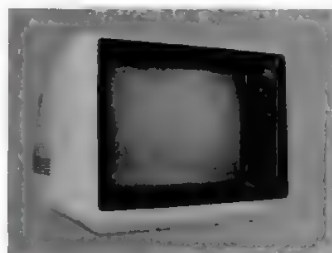
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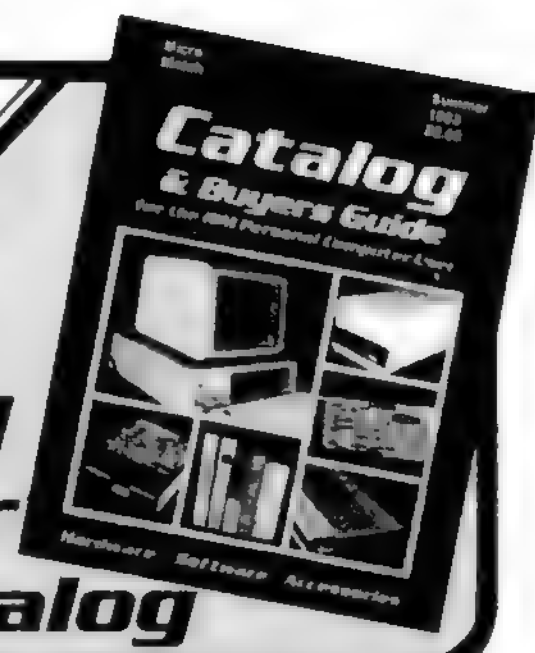
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Debugging Bad Habits

Your programming and program-testing habits will determine how successful you are at program debugging and more importantly—bug prevention.

In addition to her many other talents, my wife trains dogs. Her speciality is "problem dogs"—which really means "problem owners." Rather than retrain the dogs, Dani retrains the owners who then retrain the dogs. In that sense, her dog work is very much like my program testing work. When people come to me with "problem programs," I work on the people and their habits, not on the programs. After all, it was the people who made their programs into problems.

Your good and bad habits will have more influence than any other factor in the success or failure of your program testing. It is no accident that certain programmers consistently produce better-tested programs than others.

Those who subscribe to the accidental, "native genius" school of programming should study the lives of geniuses. Take Edison. About his own life, he said, "Genius is one percent inspiration and ninety-nine percent perspiration." Another genius, Einstein, once remarked that he really didn't do anything but take the work of others and put it together in a way that had not been done before. Good program testers make a habit of drawing on the work of others—instead of starting from scratch with each new program.

Much worthwhile previous work is available to you in libraries. To make effective use of libraries in program test-



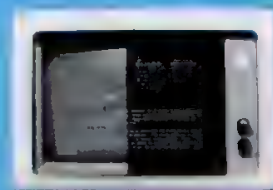
ing, you must know what kinds of libraries are available and what they contain.

The Hidden Library

One library that every programmer uses is the one embedded in the programming language. Even if you're writing machine code in binary, you're using a library—a collection of ideas, or pretested building blocks, that the machine designers thought useful. A "higher level" language is essentially one with a library that allows programs to be built with fewer building blocks. Fewer blocks means fewer connections between building blocks, which in turn means fewer places to search for errors.

Unfortunately, most programmers are not well acquainted with the contents of their language's library. Studies have

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DEBUGGING

repeatedly shown that most programmers work with a small subset of the features available in their programming languages. I knew that already; many times when a programmer asks me to help find a bug, the only one I find is created by the failure to use the language's library.

How can you get to know the contents of your hidden library? The obvious answer is to read the manual. Unfortunately, manuals are written for reference, not to be read like novels. If you know that a feature exists, and you know its name, you can look it up and find out how it works. But if you don't even suspect that the language includes such a function, how can you find it in the manual?

Another problem with manuals is their emphasis on how features work rather than on why you might want to use them. They are solution-oriented rather than problem-oriented, leaving the readers to

Professional
programmers keep
a bound journal in
which to record
everything that takes
place every day.

bridge the gap between what they're trying to accomplish and how the language could make it easier and more accurate.

There are ways to overcome some of these problems. One is to play vocabulary-building games with other programmers, challenging them to describe how a given feature works, what will result from executing that feature, or what problems it might solve. Another is the technical review, an even more effective method of social vocabulary learning. Although the review's ostensible function is to find errors in code, in my experience the long-range bug prevention benefits of technical reviews far outweigh the value of their debugging efforts.

When several people sit down as a review committee to examine code, each can see all the good techniques used in that code and also all the poor techniques. If anyone on the committee happens to know a better technique, all can learn it without ever having to admit that they didn't know it in the first place.

Other Libraries

There are, of course, many other types of program libraries besides the programming language's hidden library: procedure libraries, subroutine libraries, libraries containing tables of common data, utility libraries, libraries of parameters to direct those utilities in common tasks, macro libraries containing common code sequences, and data dictionaries containing descriptions of commonly used data elements. The amount of pretested material in such libraries is overwhelming.

Then there is the kind of library that contains good old-fashioned books. Books on programming are valuable sources for ideas about programming solutions to certain problems. They are not a good source for actual programs to be used alone or incorporated into other systems, because they usually contain errors introduced by the typesetter. Also, they are ordinarily designed to teach, not to be sources of reliable computer code.

Besides drawing on libraries of programming solutions, the best way to improve your program testing is to improve your work practices. Have you ever noticed that pig-pen programmers invariably spend more time debugging than those with tidier habits? I say this not as Mr. Clean but as an old pig-pen programmer. Despite 30 years of effort, I've never completely conquered the slovenly habits of my youth, but little by little I've eliminated sloppy practices that had previously made me waste thousands of hours of my precious time in debugging.

Here are a few of the preprogramming habits that I've noticed in effective program testers:

- **Keeping a journal.** Like all profession-

al engineers, professional programmers keep a bound journal in which to record everything that takes place every day. If you hear of the solution to a problem, write it in your journal. Months or years later, you may use it to solve a similar problem of your own.

Ideas, observations, events, glitches, successes, failures, puzzles—all are grist for the journal. You don't have to realize the importance of something at the time you write it down. Indeed, the puzzling things are the most important to record. Often, you find bugs only when they have managed to repeat themselves in a dozen ways, and only with a journal will you have all the necessary data in one place.

● **Logging.** Whenever you can file important observations in the correct category, it's best to do that rather than put them in your journal, though a cross-reference note in the journal may prove useful.

This filing principle is illustrated by the "Run Log" that I keep for my computers. Whenever there is some kind of trouble with the computer, I make an entry in the Run Log. I record all hardware and software problems as well as anything unusual, especially if I can't tell whether it's a hardware or a software problem.

The Run Log is especially useful for rooting out problems that occur infrequently. Reading over the Log for several months, I may see a pattern that would not have been apparent in any one week.

It's tempting, when a problem occurs, to solve it first and then write it up in the Run Log. Unfortunately, once the problem is solved, it's easy to neglect to write it down. Get in the habit of writing about the problem as soon as it occurs. You can add notes about the solution later. Besides, sometimes the "solution" doesn't turn out to be a solution at all, so you'll want to have a note in the Run Log to remind you that you've seen this one before.

In any case, it's good to back off for a few moments after a problem arises. Plunging right in with the first thing that comes to mind often leads to even greater

problems, such as the destruction of the data you need to solve the original problem. Writing a few words in the Run Log has a calming effect. Trying to put the problem into written words often leads directly to a solution—about half the time, I know exactly what to do by the time I've finished writing my Run Log entry.

● **Recording dates and times.** Effective testers always note the date and time to ensure that they know the order of past events. Put the date and time on everything you write down, everything you put into the computer, and everything that the computer puts out. It's an investment like insurance—it may seem a little trouble-

A Run Log is
especially useful
for rooting out
those problems
that occur
infrequently.

some at the time, but when the accident occurs, you'll be glad you bought it.

● **Standardizing formats.** People who write down the same thing in different ways always seem to have trouble later. For example, Europeans write dates as day-month; Americans use month-day. Obviously either method is workable, but used together they make a mess. To avoid such confusion, I use a standard dating method, 12 September 1987, that also forces me to remember to write the year. You'd be surprised how many bugs I've had that survived more than a year. Even if your idea of what should be standard changes, one advantage of any standard format is that it allows an easy transition to a new one. And if you date everything and record the change in standards in your journal, you can always figure out what standard applies to a particular item.

● **Keeping Time.** When debugging, I tend to lose track of time. So I've estab-

lished the habit of carrying an alarm watch and setting it whenever I estimate that I should solve a programming problem within a certain amount of time. A regular watch won't do, because you have to "watch" a watch—and when I'm debugging, I'm lost in another dimension in which I can't see anything but the problem in front of me. When the alarm watch goes off and the problem still isn't solved, I'm forced to "beam down" to the real world and reexamine my assumptions. My alarm watch has probably saved me thousands of hours of fruitless debugging.

● **Filing.** A good filing system is also very important. Unfortunately, filing is an area in which I still could use improvement. My journal often serves as an index to filed items, and learning to date every item was a great leap forward for me. But I still find too frequently that I know I've put away the solution to a particular problem, but I can't find it in my files.

Obviously, I'm in no position to tell other people how to file the myriad documents—test results, bug reports, articles, correction letters—that might be needed when testing a program. Probably the most important principle I have learned is to think, when filing something, about the question I'll be asking when I want to retrieve it. That question is my best guide for where to file it. Recently, when I've been unable to reduce an important item to a single question, I've taken to filing a reference to the item in several places.

● **Learning from other people.** The final habit on my list has undoubtedly done more than all the others combined to make me a better program tester. I don't know how I acquired this habit—I certainly didn't have it when I went to school—but somewhere along the line I learned to listen to other people and to watch them. Even though I make lots of my own mistakes, I have a hard time learning from them. Besides, there are so many other people making mistakes that I can learn even more from their blunders. I think that's how Dani learned how to train dogs—and dog owners. ■



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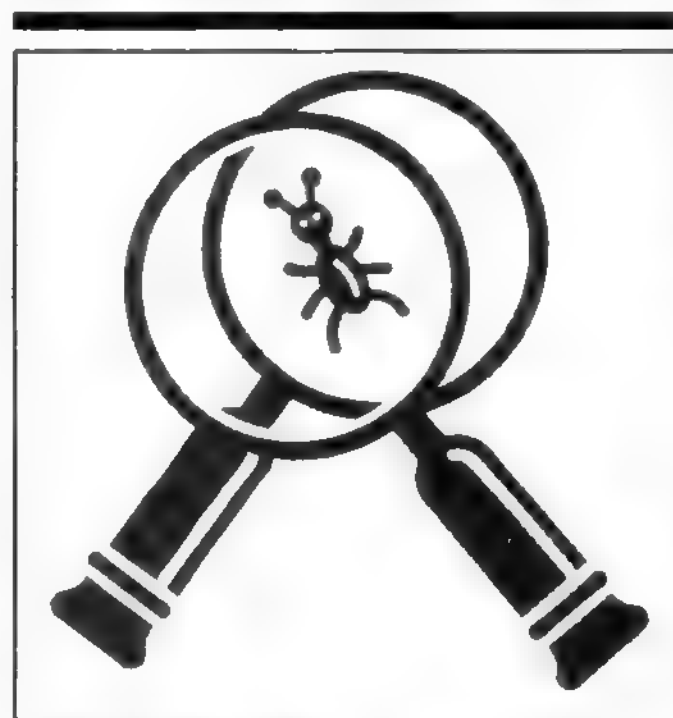
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User-to-User

PC readers use this forum to help one another by passing along their questions, solutions, comments, and complaints.



Borrowing from ROM

Using all 256 IBM/ASCII characters on the PC's text screen lets you create borders and fairly sophisticated pictures by cleverly stacking line fragments and character building-blocks together.

However, for some reason IBM doesn't let you display the top 128 IBM/ASCII characters on its PC graphics screens. If you run the following short program:

```
10 ' test1.bas
20 SCREEN 0
30 FOR A=128 to 255
40 PRINT CHR$(A);
50 NEXT
```

you'll see every one of these "high-bit" characters (so named because the leftmost bit—the "high" one—in the binary representation of the ASCII value of the character is a 1 rather than a 0).

However, run the same program in the graphics screen:

```
10 ' test2.bas
```

```
20 SCREEN 1
30 FOR A=128 to 255
40 PRINT CHR$(A);
50 NEXT
```

and all you'll get is garbage—random patterns based on whatever happens to be in the high-bit memory area at the time.

You can, of course, create and use your own high-bit graphics character set, as John Schnell documented adroitly in his article "Exercising ASCII" (PC, Volume 1 Number 12). Schnell demonstrated how to print upside-down and/or backwards characters on your screen.

The PCjr, on the other hand, does allow you to use the high-bit ASCII characters on its many graphics screens. Best of all, the dot patterns that make up the high-bit characters are accessible: You can snoop inside the PCjr ROM, pull the patterns out, load them into your PC, and use all 256 characters on your PC graphics screens.

The program ROMSTEAL.BAS in Figure 1 does everything for you automatically. All you need is a handy PCjr. Find a friend who has one (or visit your local computer store), stick a disk with ROMSTEAL on it into the PCjr, run it, and take the important codes home to load into your PC or XT. It's not illegal—the same codes are already in your PC. They're just not accessible under all conditions.

ROMSTEAL won't work if you try to snoop inside a PC or an XT. The program starts by testing to see what machine's ROM you're looking into. It examines the contents of address &HFFFE at the very top of memory, and if it finds a value of


```

100 ' ROMsteal -- borrows PCjr highbit character set -- CHR$(128) to CHR$(255)
110 CLS
120 DEF SEG=&HFOOO
130 IF PEEK(&HFFE)=&HFD THEN 150
140 PRINT "Insert this disk in a PCjr only!":END
150 PRINT "Reading ROM . . ."
160 OPEN "CHARGEN.BAS" FOR OUTPUT AS #1
170 PRINT #1,"100 ' Program to read high-bit ASCII characters into memory"
180 PRINT #1,"110 CLS:PRINT ";CHR$(34);"standby while high char set installed"
190 PRINT #1,"120 DEF SEG=0"
200 PRINT #1,"130 OFFSET.LSB=0 : OFFSET.MSB=0"
210 PRINT #1,"140 SEGMENT.LSB = PEEK(&H510) : SEGMENT.MSB=PEEK(&H511)+&H11"
220 PRINT #1,"150 ABOVE.BASIC = SEGMENT.LSB + SEGMENT.MSB*256"
230 PRINT #1,"160 POKE &H7C,OFFSET.LSB"
240 PRINT #1,"170 POKE &H7D,OFFSET.MSB"
250 PRINT #1,"180 POKE &H7E,SEGMENT.LSB"
260 PRINT #1,"190 POKE &H7F,SEGMENT.MSB"
270 PRINT #1,"200 DEF SEG = ABOVE.BASIC"
280 PRINT #1,"210 FOR A=0 TO 1023"
290 PRINT #1,"220 READ B"
300 PRINT #1,"230 POKE A,B"
310 PRINT #1,"240 NEXT"
320 PRINT #1,"250 DEF SEG:SCREEN 1:CLS"
330 PRINT #1,"260 FOR X=128 TO 255:PRINT CHR$(X);:NEXT"
340 FOR AA=1 TO 1024 STEP 8
350 A=(AA-1)/8:LNUM=STR$(A*10+270)
360 PRINT #1,RIGHT$(LNUM,LEN(LNUM)-1);CHR$(32);"DATA";CHR$(32);
370 FOR L=1 TO 8
380 S=STR$(PEEK(&HE05C+AA*L))
390 PRINT #1,RIGHT$(S,LEN(S)-1);
400 IF L<8 THEN PRINT #1," "; ELSE PRINT #1,TAB(50);CHR$(58);CHR$(39);128+A
410 NEXT L:NEXT
420 PRINT "CHARGEN.BAS file created -- now run it on a PC or an XT"

```

Figure 1: ROMSTEAL, a program that borrows the PCjr's high-bit character set and creates the program CHARGEN.BAS that lets you use the extended character set in graphics mode on the PC or XT.

&HFD it knows you're using a PCjr. (If it finds a value of &HFE you're using an XT or a PC portable; if it sees &HFF you're using a garden-variety PC.)

When you run ROMSTEAL.BAS on a PCjr, the program will create a new BASIC program called CHARGEN.BAS on your default disk. CHARGEN.BAS contains data statements for all 128 high-bit characters as well as the programming needed to set the pointers and load the new characters into memory using John Schnell's trick for locating the top of BASIC in memory.

To use high-bit characters on your PC graphics screen, you'll first have to run CHARGEN. If you write a program to run on someone else's PC or XT and you want to include graphics and high-bit characters, you'll have to include the important DEF SEGs, POKEs, and DATA statements from CHARGEN in your new program.—P.S.

Beeping Through a Box

Formatting a box of diskettes is a chore we

all have to live with. I usually page through a copy of *PC Magazine* to break the monotony, but it is annoying to constantly look up to see if the formatting process is complete. It sure would be nice if a beep sounded when the formatting was done. I've changed a copy of the FORMAT.COM supplied with DOS 2.0 to do just that. I replaced the question mark in the "Format Another (Y/N)?" prompt with a character 7 (beep). To do this under DOS 2.0, copy DEBUG.COM and FORMAT.COM onto a disk, and type the following (hitting the Enter key at the end of each line):

```

DEBUG FORMAT.COM
E CC3
7
W
Q

```

After you've done this, the computer will beep each time it wants to know whether you plan to format more disks.

Harry Koepfel
Hoffman Estates, IL

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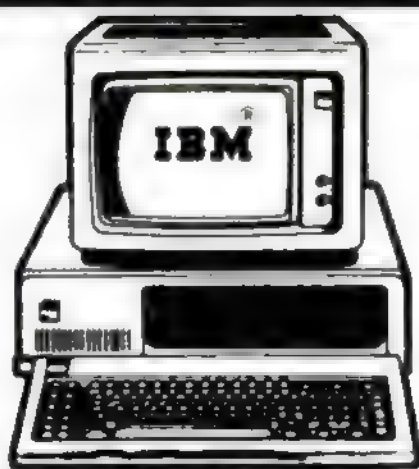
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USER-TO-USER

Good idea. There's nothing more boring than formatting disks (except maybe backing up a hard disk, and the backup process has its own beeps built in). If you're using versions other than 2.0, the address of the change (in the second line of the DEBUG instructions above) is different from CC3. For DOS 1.1, the second line should read E 75F. For DOS 2.1 the second line should read: E F85. Be sure to do this with a copy of your FORMAT.COM file, not the original, in case you accidentally do something wrong.

Scrolling Surprise

When you try to put a character on the screen in the last column position (80) of lines 24 and 25, you'll find that BASIC has a nasty habit of scrolling the whole screen up a line. While this has its uses, most times it yields disastrous results, especially when you're running a graphics program.

The usual way to get around this is to POKE the ASCII value for the character plus the proper attribute value for that character into the appropriate part of screen memory. This gets complicated if the program has to run on both the monochrome and the color cards—you first have to check which card is active, then select the proper screen addresses.

A much simpler solution is to change the scroll window information stored at addresses &H5B (the line where the scroll window starts) and &H5C (the line where the scroll window stops). Try the short program in Figure 2 and you'll notice that the screen doesn't scroll.

Don't forget to set the bottom of the

window back to 24 or you'll be locked out of the keyboard.

John Schnell
New York, NY

Great. Nothing more maddening than watching graphics scroll up a line. Be careful when you change the number of lines in the window. As Schnell points out, you may run into trouble if you make it too small. If this happens, you can usually get out of it by typing: POKE &H5B, 1: POKE &H5C, 24 in the one line that remains active.

Output Shifter

Here's a tip that will save having to duplicate PRINT statements with LPRINT statements whenever you want to send the output of a program to the screen and the printer. Instead of using the PRINT statement, use the PRINT # statement. Before executing any of these PRINT # statements, OPEN the appropriate device for output.

For example, if you enter OPEN "SCRN:" FOR OUTPUT AS #1, then whenever the PRINT # statement executes, the output will go to the screen just as it would if it were using an ordinary PRINT statement. If you want a hard-copy version of the same output, you only need to first CLOSE the file and then OPEN it again, using your printer as the output device (OPEN "LPT1:" FOR OUTPUT AS #1).

Apparently you have to OPEN the screen as a sequential output and OPEN the printer as a random access output to avoid syntax or bad file mode errors. Figure 3

```
10 SCREEN 0:WIDTH 80:KEY OFF:CLS
20 DEF SEG
30 POKE &H5C,0           'disables scrolling.
40 LOCATE 24,80
50 PRINT "X";            'prints X at line 24, column 80
60 LOCATE 25,80
70 PRINT "Y";            'prints Y at line 25, column 80
80 POKE &H5C,24          'set bottom scroll window back to line 24.
```

Figure 2: A program to prevent the screen from scrolling.


```

100 ' PRINT/LPRINT shifter demo -- by Jeff Mitchell
110 '
120 OPEN "SCRN:" FOR OUTPUT AS #1 'open screen for output
130 PRINT #1, "This message will appear on your screen"
140 CLOSE #1
150 OPEN "LPT1:" AS #1 'open printer for output
160 PRINT #1, "This message will appear on your printer"
170 END

```

Figure 3: An adaptation of the screen/printer PRINT # module that you can merge into your existing program to switch outputs.

```

100 ' PRINT/LPRINT shifter demo2
110 '
120 PRINT "Where should the output go --"
130 PRINT TAB(10); "1 -- Screen"
140 PRINT TAB(10); "2 -- Printer"
150 I%=INKEY$:IF I%="" THEN 150
160 ON VAL(I%) GOTO 180,190
170 BEEP:GOTO 150
180 OPEN "SCRN:" FOR OUTPUT AS #1:GOTO 210
190 OPEN "LPT1:" FOR OUTPUT AS #1
200 '
210 ' ** program continues here **
220 '
230 PRINT #1, "This is a test"

```

Figure 4: An adaptation of the screen/printer PRINT # module that you can merge into existing program to switch outputs. (Turn all subsequent PRINTs into PRINT #s.)

shows a simple demonstration program.
Jeff Mitchell
Ogden, UT

This beats saving your programs as ASCII files and going in with your word processor to search and replace all the PRINTs with LPRINTs. You can add an adaptation of this (Figure 4) to your programs to shuttle outputs either to screen or printer with the press of a key. However, don't expect miracles, especially with fancy formatting. LOCATEs don't do much on printers. To shift outputs between printers and screens, use repeated PRINT statements and TABs to position the output.

Saving Sorting Steps

Patrick Banchy of New York City points out that there is an easy way to save a step when creating a master diskette directory ("Sloppy Floppies," PC, Volume 3 Number 5, page 410). Rather than creating individual directories and then merg-

ing them using the COPY command, Banchy uses the double "greater than" sign (>>) to append the files as they are being sorted and redirected:

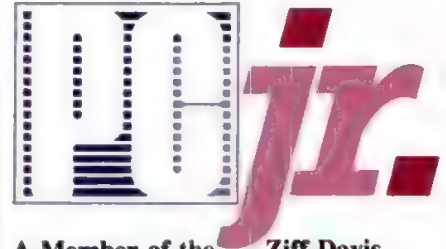
```
C>DIR A: | SORT>>DIRECTRY
```

He also correctly notes that to save keystrokes you should type this command once, then hit the F3 function key each time you put a new diskette in drive A:. Remember, to be able to take advantage of this economizing feature, you must have SORT.EXE on your logged drive (in this case the logged drive is C:).

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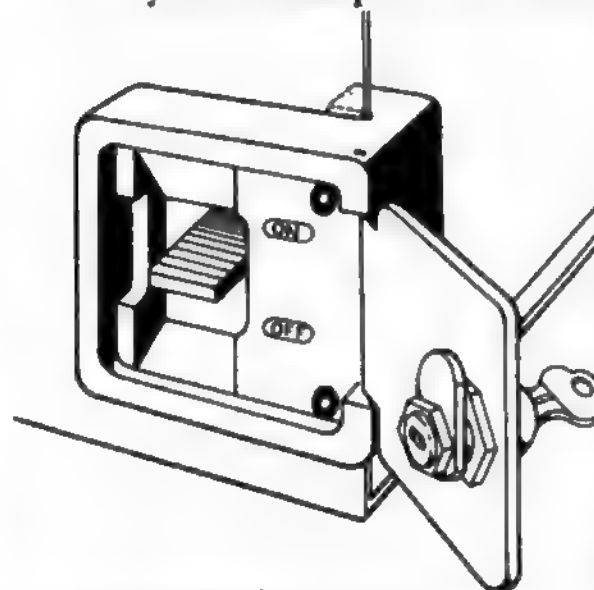
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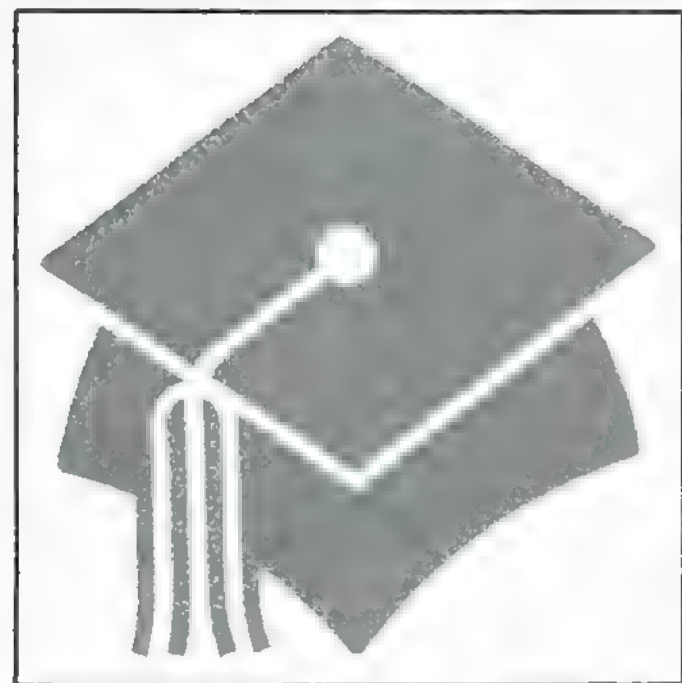
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MARK ZACHMANN

PC Tutor

Silencing Solenoids

Q: My IBM PC has a pair of Teac model 55B disk drives. These drives step very quietly but generate a considerable



amount of noise through the action in their head load solenoids. Each time a drive is activated, the solenoid clicks while positioning the head.

Is there some way to reconfigure the jumpers to eliminate the solenoid, or will this create other problems?

Theodore A. Lobsenz
Hawthorne, New Jersey

A: I was very surprised, when the IBM PC first came out, at the design of its disk drives. Up until then I had never seen a disk drive without a head load solenoid. In most cases, the solenoid (an electromagnetic latch) is used to lower the drive's head onto the disk.

Apparently, Teac has returned to using the solenoid design. You can't just cut the solenoids out of your drive's operations because nothing else would lower the heads onto the disks.

You might be able to keep the heads permanently lowered, but I'd advise against doing that. For example, the CDC and Tandon drives used by IBM keep the

heads up until you insert a disk and close the drive door. If the solenoid is turned off, opening the drive door may not do enough to keep the heads apart. In that case you are courting trouble since inserting a disk while the heads are lowered is sure to either ruin the disk or the heads. Keeping the heads down all the time also causes additional disk wear, so you may be best off leaving things as they stand.

How Big Can BASIC Be?

Q: Given a system that's running PC-DOS 2.0, how large a BASIC source code, which includes DIM statements, could be written in the first 64K of RAM?

Robert Muksian
Cranston, Rhode Island

A: First, don't forget that your BASIC program is not the only thing that takes up space in your system. According to the memory map on page I-2 of IBM's BASIC 2.0 manual, the system has the following constraints:

- The IBM system takes up 1536 bytes.
- PC-DOS 2.0 requires about 12K.
- Disk BASIC takes up about 8K, BASICA takes up about 13K.
- Another 4K are used as the interpreter's work area.
- About 512 bytes are dedicated to a stack for temporary storage in your program.

This comes to a total of about 31K. In an IBM PC with 64K RAM, PC-DOS 2.0, and BASICA, you'd have about 33K available for your BASIC program and data storage.

This is only an approximate amount, because all sorts of factors can decrease the available memory space. For example, if you use the CONFIG.SYS option of PC-DOS 2.0 to declare some disk buffers,

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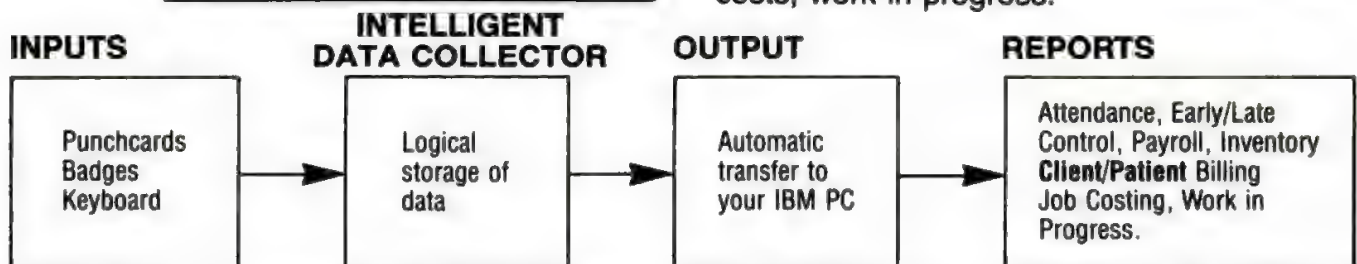
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or if you have a clock driver, these options will take up part of the memory.

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- 4 bytes
- + the length of the name
- + 1 byte per character

Each scalar variable (i.e., a single number) takes up:

- 1 byte
- + the length of the name
- + the amount required by the data type (2, 4, or 8 bytes)

Integers take up 2 bytes; real numbers take up 4 bytes if they are single-precision values and 8 bytes if they are double-precision values.

Break Trapping

Q: Could you please explain how to trap Ctrl-Break in BASIC versions 1.1 and 2.1?

Alexander Morris
New York, New York

A: Although it's feasible to trap Ctrl-Break in BASIC 1.1, you'd need to use an inelegant hunk of machine language code. The KEY and ON KEY statements in BASIC 1.1 can only trap the ten function keys (identified by numbers from 1 to 10) and four cursor keys (indicated by values from 11 to 14). You're better off switching over to the newer BASIC (2.0 or later), which lets you write this routine to trap Ctrl-Break:

```
10 KEY 15, CHR$(4)+CHR$(70)
20 ON KEY (15) GOSUB 1000
30 KEY (15) ON
```

First the key statement in line 10 assigns the value 15 to the Ctrl-Break key combination (you can use values from 15 to 20 to identify special key combinations in BASIC 2.0 KEY statements). Then line 20 specifies that a subroutine (assumed here to begin at line 1000) is called whenever Ctrl-Break is pressed. Finally, line 30 activates the key-trapping for Ctrl-Break.

Searching for Sprites

Q: How do sprites work and how can you get them on the IBM PC?

Douglas Pagel
Churchville, Maryland

A: Sprites are one system for manipulating graphics images. A sprite is a picture that is manipulated by a computer's hardware as if it were no more complex than a single picture element. Some home computers, such as the TI-99/4a and Commodore 64, have graphics systems that specifically support sprites.

The IBM PC and PCjr do not support sprites with their graphics hardware. You can, however, emulate sprites in software. With the PUT and GET statements in Advanced BASIC you can get results much like sprite manipulation.

Putting Tabs on Tap

Q: I read an item about using the NEC-8023 printer with an IBM PC in "User-To-User" (see "NEC Vertical Tabs," PC, Volume 2 Number 7, page 660). I tried this technique, but my printer (an NEC PC-8023A-C) doesn't seem to recognize tabs. I have tried various combinations of the printer's #1 and #2 switches, to no avail.

Another problem is that I don't know how to produce the unusual character shown in the program listing for that item (Figure 4 on page 656). Could you please help me out?

Michael Binkhurst
Van Nuys, California

A: That mysterious character is simply the way one printer renders the at sign (@). It may not look the same on your keyboard or printer, but you can generate it by holding down a Shift key and pressing the number 2 key on the top row of the keyboard.

The switches on your printer have no effect on the horizontal tabs. To use the tabs on the NEC 8023 printer you must run a short program that sets the tabs on the printer. The program must first send

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PC TUTOR.

an Esc (which is ASCII 27) and then an open parentheses. After these two characters, give the column numbers of the tab settings you want, separating these numbers with commas. End the series of tab numbers with a period.

For example, the following BASIC statement will set nine tabs at 8-character intervals:

```
10 PRINT CHR$(27)+"(008,016,024,032,040,048,056,064,072,";
```

After you run this statement, the printer will recognize these tab settings until you reset or turn off the printer. If you want to use different tab settings in this statement, make sure that each column number is indicated with exactly three digits.

Helping HBASIC

Q: I use an IBM PC with 256K, two disk drives, a Hercules graphics board, and an Amdek 310A monitor. I have a problem when I attempt to run *HBASIC*, a program from Hercules that modifies *BASICA* to use the special graphics board. All I get is yellow static lines across the top and bottom of the monitor's screen. Also, the keyboard locks up.

I talked to my dealer, I tried to run another copy of the program disk, and I tried to run *HBASIC* under both PC-DOS 1.1 and 2.0—all to no avail. Since the program I usually use, Lotus' 1-2-3, works fine with the Hercules board, I probably won't have much use for *HBASIC*, but I would like some assurance that the board and all the other hardware in my system are functioning properly.

Robert P. Vlick
Glendale, California

A: Since the Hercules board works with 1-2-3, I think you aren't having hardware problems. It's most likely that *HBASIC* is malfunctioning. The copy I have works fine, so there isn't anything inherently wrong with the program, but it's possible that you have a flawed copy.

It's also possible that you are initiating *HBASIC* incorrectly. A copy of *HBASIC*

only works with one version of *BASICA*, since Hercules' program alters the interpreter's code in an intimate manner. You need to ensure that the correct version of *BASICA* is on the *HBASIC* disk and that you call *HBASIC* correctly. Check the *HBASIC* documentation to see exactly how to load *HBASIC*.

Mixing Monitors

Q: I own an NEC 1201M green display, which accepts a composite signal from my IBM PC's color/graphics adapter.

I'd like to take advantage of word processing programs that do on-screen underlining, but the underlining won't show up because I use the color/graphics adapter. If it is feasible to change the display's input from a composite video signal to the TTL signal, would I be able to install a monochrome board to get underlining and better text resolution? Can I do this without having to invest in another monochrome monitor in addition to the new display board?

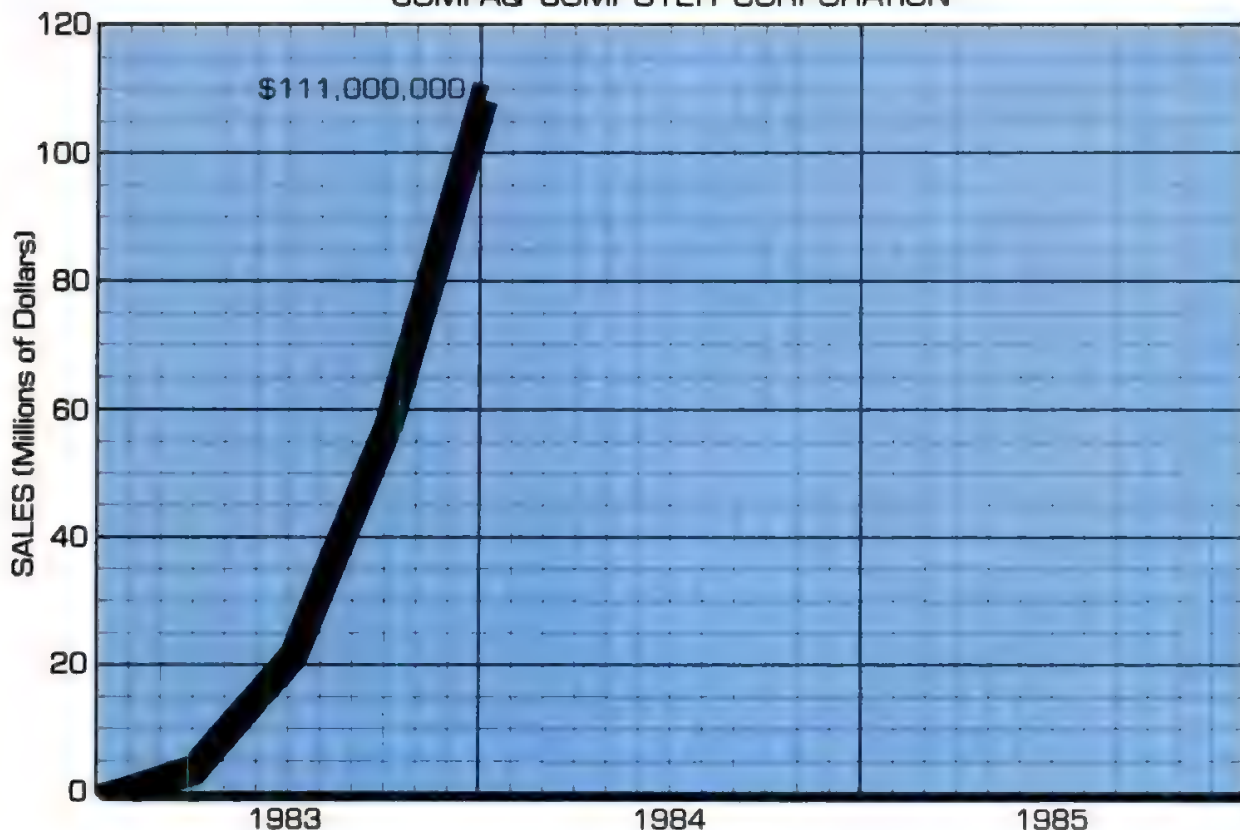
Wayne Lau
Seattle, Washington

A: It really isn't feasible to plug the IBM monochrome board into anything but a display designed for the card—an IBM monochrome monitor or a workalike. Since the monochrome and color/graphics boards run at very different speeds, and the monochrome board has separate sync and video outputs, you would have an awful task in front of you.

The monochrome board runs at a horizontal frequency of 18.7 KHz, while the color display runs at 15.75 KHz. If you connect these devices and mix up these frequencies, you usually will get a loud whining noise. Even worse, if you plug the color/graphics adapter into the mono-

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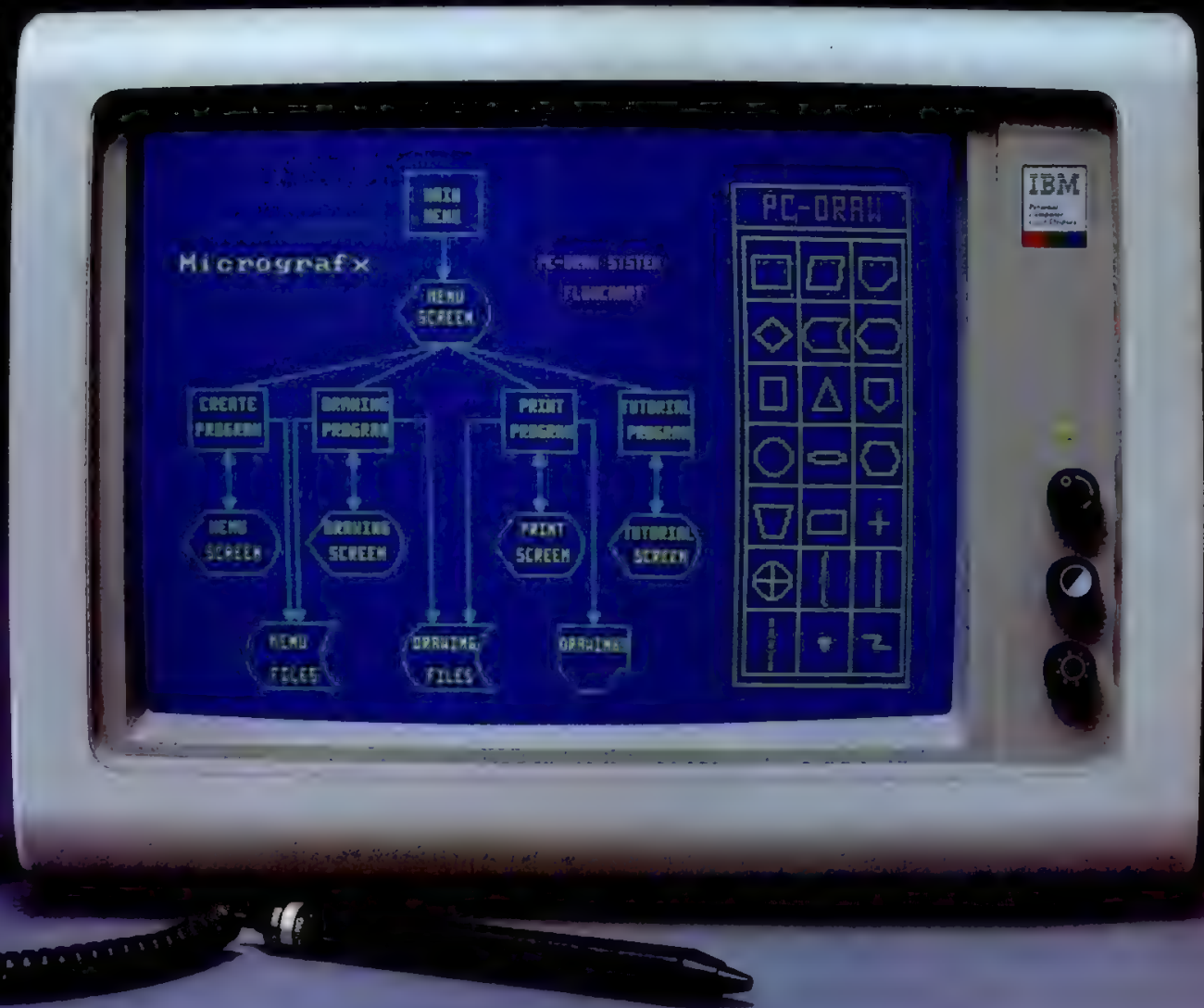
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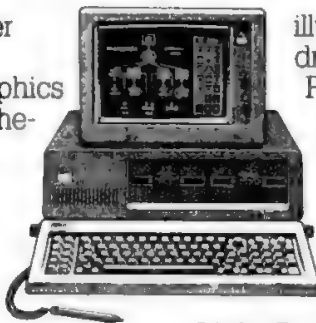
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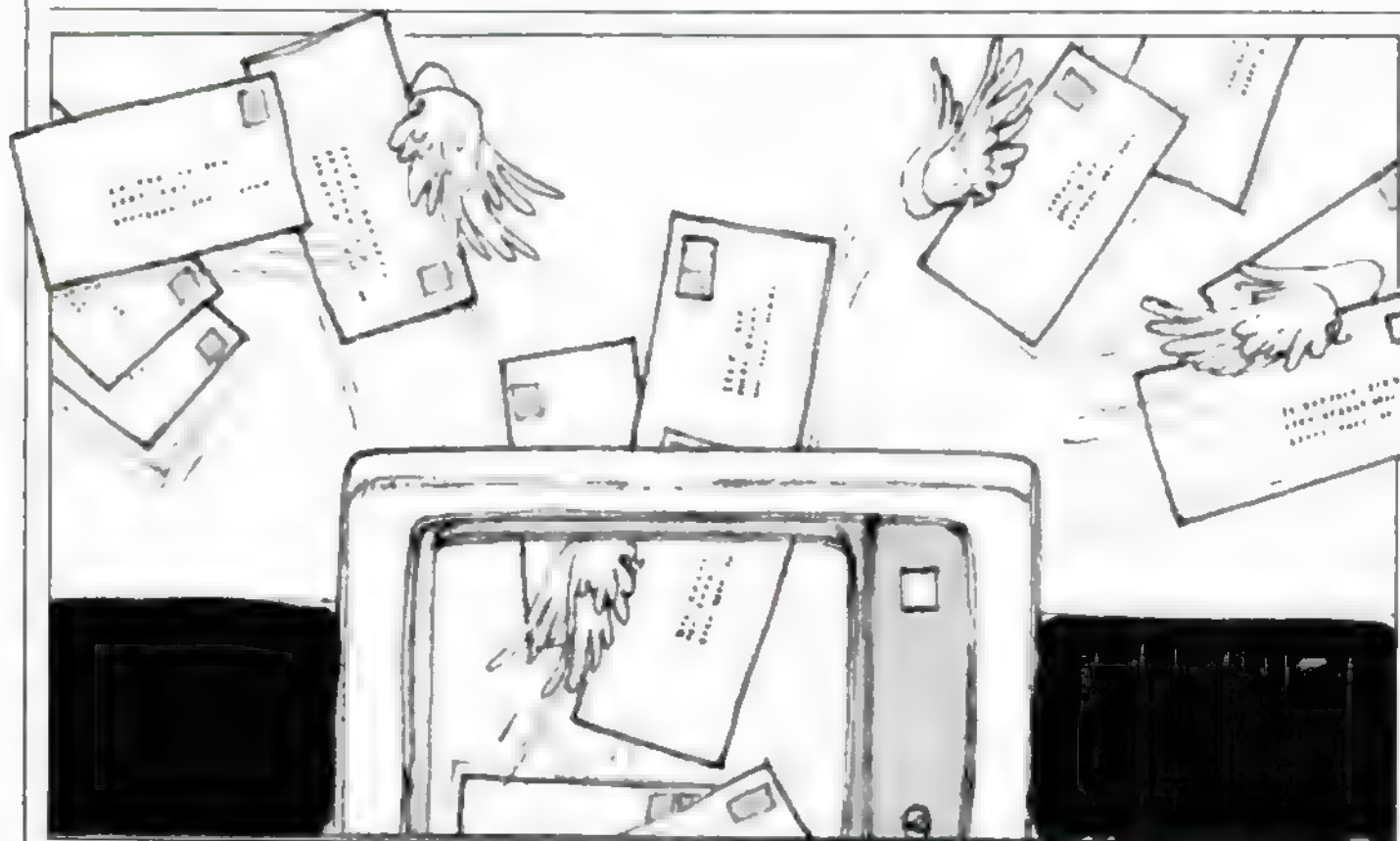
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with fields for "To," "Subject," and "cc:" (which means "carbon copy"). If the recipient does not have an MCI account or if you want to send a paper version of your message, you fill in the complete address. Otherwise, all you need is the recipient's MCI "user name."

Next, you type in the text of your message. You can use any printable ASCII character plus common formatting characters such as Return, Tab, and linefeed. MCI pays attention to only the 7 lower bits of each character, so you can't send formatted *WordStar* files or program files (although some communications packages can solve that by sending each character as two hexadecimal digits).

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You might also have problems with MCI's billing system; for instance, you don't get bills itemized by message unless you ask Customer Service how to use the undocumented "Charge:" option in your addresses. You'll have to read any critical documents carefully before you send them because the system doesn't support any error-checking method like the XMODEM protocol between your PC and MCI's computer. You may not want to pay the \$10 extra charge per month for Advanced Service, but once you get used to the system you'll find the Basic Service's menu structure excruciatingly slow.

Even with these problems, you ought to sign up with MCI Mail. If the instant electronic delivery or quick hard-copy delivery services help you meet just one tight deadline, it will be well worth your trouble. In fact, after a few crucial deliveries, you'll begin to wonder how you ever got along without it.

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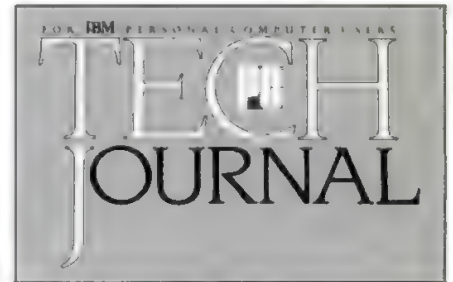
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The dBASE II Universe

The dBASE II package has been joined by an army of relational database managers, but so far it has maintained its dominant position among the large-scale systems available for the PC.

PC Tech Journal will devote most of its July issue to dBASE II, its file structures, techniques for application developers, and the considerable after-market it has spawned.

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A primer on relational database managers, followed by the complete technical details of how information is stored in dBASE II files.

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Wine Data 2

If you don't know a Barolo from a Barbaresco and if after studying a restaurant wine list you still lack the courage to order anything stronger than a glass of water, then we have a program for you. The second installment of our wine rating reference files is a database of ratings for Italian red wines. These wines have been rated by label and year and can be accessed by either category. Once you run through this program, you can impress your friends and associates with your oenological knowledge. Last issue we covered French wines. Coming up next will be the wines of California.

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Parents work hard to provide their children with opportunities they missed out on. With *Early Reader* you can give your children a head start on reading and introduce them to the academic trend of the future—the computer. This useful tutorial employs bold, colorful graphics to create a modern version of flashcards, an innovative alternative to the dull black-and-white cards of days past. The format of this program allows you to design a variety of educational tools to accelerate your child's learning. *Early Reader* is an enjoyable way to spice up spelling drills and reinforce basic reading skills.

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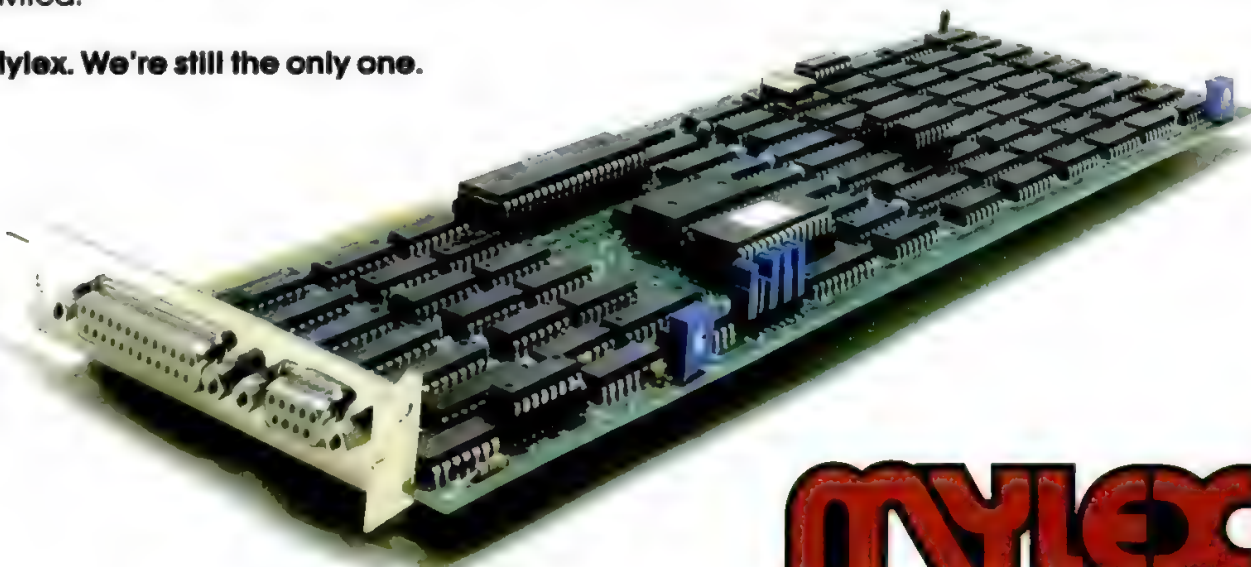
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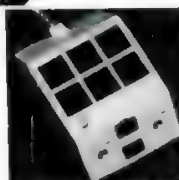
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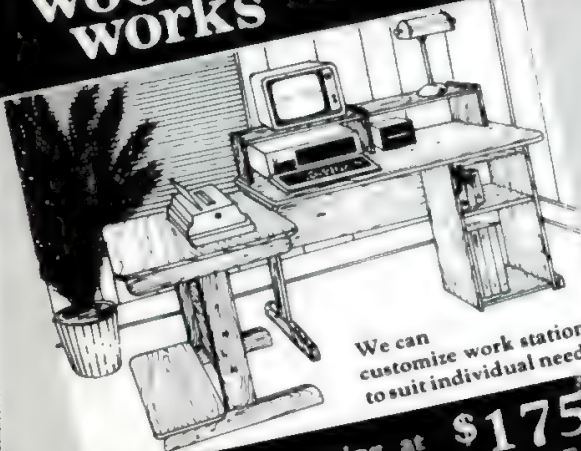


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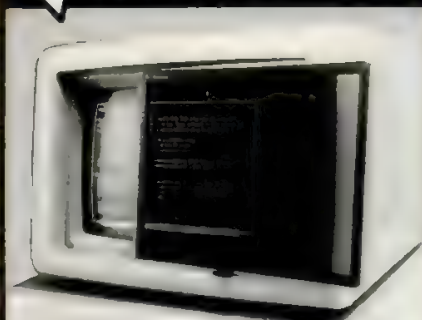
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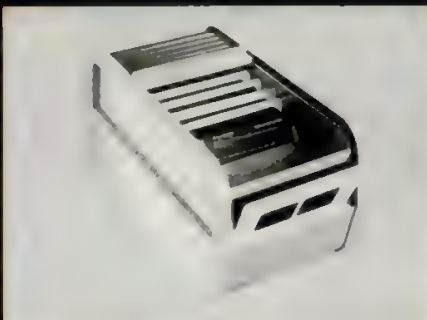
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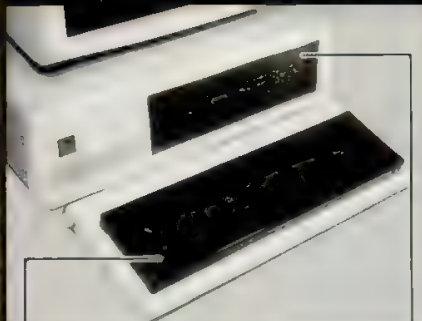
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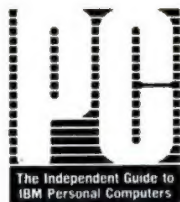
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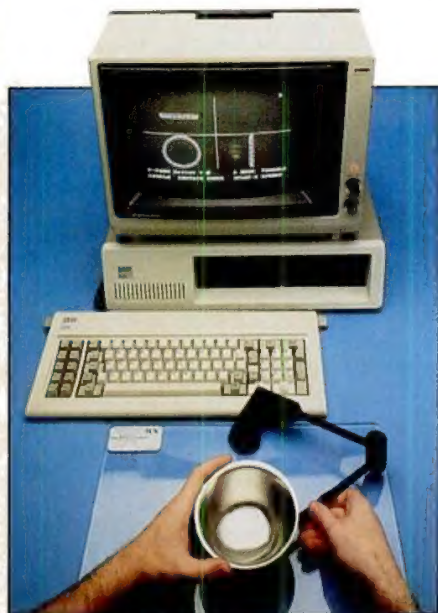
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The Independent Guide to
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Coming Up



Alternate Input Devices

Have you ever looked at your PC's keyboard with dismay and thought, "There's got to be a better way to input information"? There is. Many alternate input devices can almost magically transport information to a PC. Optical card readers, bar code scanners, and magnetic strip readers allow the computer to "read" books and other media. When you draw on a tablet, a line appears on the screen; touch it in a certain place, and you can give the PC instructions. Point a digitizing camera at a photograph, and presto, a digitized image of the picture is instantly stored in the computer. You can even arrange to order your computer around verbally with a voice-activated system, point out instructions on a touch-sensitive screen, or help the handicapped with a one-handed system. We'll take you on a guided tour of these devices and more.

DBMS Packages

PC Magazine presents a series of reports reviewing the 65 database management software packages on the market today. The second part of the series will take a look at 11 programs on the lowest level of DBMS—databases that act as electronic file boxes, allowing the user to access information as records or fields. These products are competing in an incredibly crowded field on the basis of ease of use, speed, capacity, and price. Here's the scoop on how these databases measure up. Once again, the results of the reviews are conveniently summarized in tabular form.

PCs at Church

A PC and *The Ark*, a church management software package, are spreading the word to members of the Manor Baptist Church in San Antonio, Texas. Ed Joyce will tell you how the PC brings together the church's far-flung flock; manages its general ledger, balance sheet and contributions, its music library, and the Community Outreach for Older Persons program; and helps the church's pastor maintain diverse religious services and sermons.

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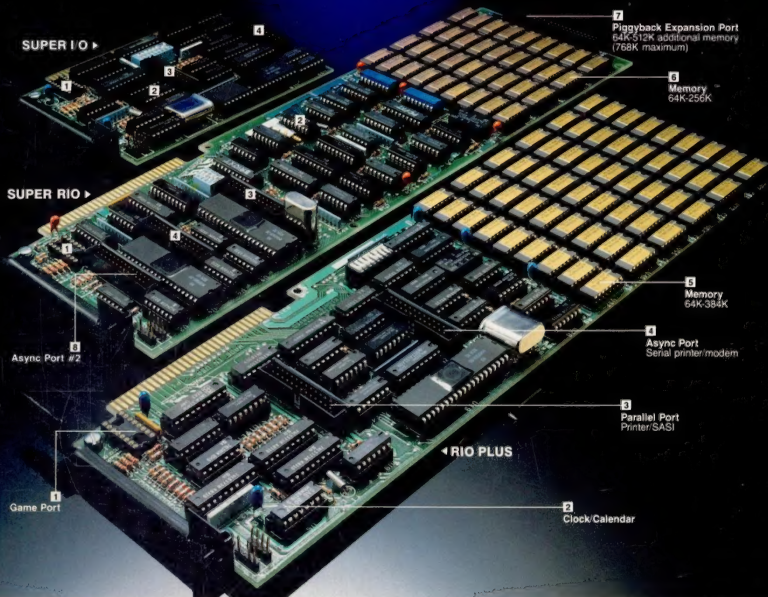
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